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Problems related to rapid reduction of the agricultural labor force were examined in the 21 Organisation for Economic Co-operation and Development countries. The size and changes of the agricultural labor force, economic forces tending towards change, technical requirements for labor in agriculture, and obstacles hindering economic adjustment of agricultural labor were scrutinized. Some conclusions were: (1) The exodus from agriculture has recently accelerated, (2) The highest rate of decrease was in the United States, (3) The outflow of agricultural labor has contributed to the nonfarm labor supply, (4) There is a decreased percentage of young adults in agriculture, (5) The agricultural exodus can primarily be explained by unfavorable incomes, and (6) Agricultural exodus is a normal part of economic change leading toward higher levels of living for all groups in a society. It was recommended that: (1) the trend towards fewer agricultural workers be recognized as a normal part of modern economic development, (2) mobility of manpower be recognized as beneficial to economic growth, (3) rural education be similar to that in the urban areas, and (4) economic activity be encouraged in areas threatened with de-population. The report contains separate chapters on Denmark, France, Germany, Italy, Netherlands, Spain, Turkey, and the United States. (DM)

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PROBLEMS OF MANPOWER IN AGRICULTURE

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ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

The Organisation for Economic Co-operation and Development was set up under a Convention signed in Paris on 14th December 1960 by the Member countries of the Organisation for European Economic Co-operation and by Canada and the United States. This Convention provides that the O.E.C.D. shall promote policies designed:

- *to achieve the highest sustainable economic growth and employment and a rising standard of living in Member countries, while maintaining financial stability, and thus to contribute to the world economy;*
- *to contribute to sound economic expansion in Member as well as non-member countries in the process of economic development;*
- *to contribute to the expansion of world trade on a multilateral, non-discriminatory basis in accordance with international obligations.*

The legal personality possessed by the Organisation for European Economic Co-operation continues in the O.E.C.D. which came into being on 30th September 1961.

The members of O.E.C.D. are Austria, Belgium, Canada, Denmark, France, the Federal Republic of Germany, Greece, Iceland, Ireland, Italy, Japan, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, the United Kingdom and the United States.

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FOREWORD

The present report results from a study of the probable excess of labour in agriculture which was carried out in 1963 as part of the programme of work of the Committee for Agriculture of O.E.C.D. It deals with present and probable future changes in the agricultural labour force in O.E.C.D. countries, in particular, during the decade 1960 - 1970, and with the resulting problems likely to arise in this sector. The report gives full consideration to the rate of economic growth envisaged under the O.E.C.D. 50 per cent Growth Target for the period 1960 - 1970.

The report contains separate chapters on 8 different countries, selected to represent the most important of the various types of situations found in O.E.C.D. Member countries. The general report comprises information derived from many other countries; and generalisations have, insofar as possible, been based on what is known of tendencies in all Member countries.

The report was prepared by Professor F. Dovring (Department of Agricultural Economics of the University of Illinois, United States) who acted as O.E.C.D. consultant for this activity. A group of experts met twice in 1963 (July and November) to discuss drafts of the report with the Consultant prior to its finalisation. A list of the experts will be found in Annex III.

The Committee for Agriculture considered this report at its 13th Session in January 1964 at which time, in view of its value and usefulness, the Committee transmitted it to the meeting of the Committee at Ministerial level in February 1964 for information and reference.

In publishing this report the O.E.C.D. wishes to express its sincere thanks to Professor Dovring, for his excellent work in its preparation; and to the experts for their helpful advice and comments. It is hoped that this report will make a useful contribution to the present knowledge on the problems of manpower in agriculture and will stimulate the adoption of the measures needed to promote the adaptation of agriculture to the conditions of economic growth.

INTRODUCTION

The rapid reduction of the labour force in agriculture, which goes on in the more advanced industrialised countries, has many beneficial effects. At the same time it raises problems of adjustment and restructuring of the agricultural industry. The removal of surplus labour contributes in many cases significantly to the labour force needs of expanding secondary and tertiary industries and thereby also to rising productivity in the economic system as a whole. Successive adjustments of the proportions between labour, land, and capital in agriculture means the gradual removal of age-old handicaps which agriculture inherited from the pre-industrial epoch. Rising factor productivity in agriculture benefits society and opens the path for solutions, in the longer range future, of the problems of low farm incomes and surplus agricultural production. The obvious concomitant strains on inherited institutions and the new requirements for infra-structure underline the necessity for rational policies to facilitate a transition which is under way and which is, on the whole, inevitable. Needless to say, the result of such policies will be different if they are set in a strictly limited national frame as against the result of joint policies for groups of nations, such as the European Economic Community.

The ongoing process of change in the agricultural labour force is best understood against the background of a general theory of stages in economic development. In the under-developed situation, when the agricultural population is a large majority, it is to be expected that it continues to increase in absolute size, because the sheer proportions between the main sectors of the economy forbid as high rates of expansion in the non-agricultural sectors as would be required to reduce the agricultural population or even absorb all of the increment. Through the process of differencial growth between sectors, agriculture comes to occupy a smaller and smaller relative place in the economy and labour force, and the smaller it becomes in relative terms, the better are the prospects that its surplus manpower may find employment elsewhere.

In the second phase, which prevailed in most O.E.C.D. countries until a few decades ago, the agricultural labour force was more or less static in absolute terms, while declining in percentage terms. In that phase the income level was lower, demand elasticity for food was higher. Agriculture could expand production, especially of higher-elasticity food-stuffs (animal products, vegetables, etc.). Expanding demand created the basis for increases in farm income which averted any radical change in the radio between agricultural and non-agricultural incomes (the "parity ratio"). In periods of rapid industrial growth there was, nevertheless, some tendency for this disparity between farm and non-farm incomes to widen. All the while, there was a chronic surplus of farm labour throughout Europe, largely though not entirely disguised by the use of techniques and habits of work which were tailored to the situation. Intensification to meet expanding demand went along with considerable technological progress in many areas, thus creating anew a disguised manpower surplus despite the increasing volume of activity and production. This process applies in some degree to North America too. The farm sector was as yet too large for its surplus of manpower to be readily absorbed in the city sectors with their recurrent unemployment problems. The persistent surplus of agricultural manpower acted as an effective deterrent against substituting capital for labour on any large scale. It is less generally noted that the capital goods industries, previously, were not in a position to produce heavy farm equipment in quantity, let alone the fact that most farmers would not have been able to finance the purchase of such equipment, even if they had intended to do so.

This apparently static farm labour situation was broken in one country after another during the last three to four decades. The present phase of dynamic change in agriculture in the highly industrialised countries depends foremost on quantitative changes in the factors mentioned above. For one thing, incomes are higher and the demand elasticity for food is lower, which limits the possible role of output expansion in agriculture. The general income level is rising faster than demand for agricultural products can expand. Farm people should then become fewer in absolute terms: otherwise they would fall further and further behind in relative income, or else the community would be saddled with a cumulatively increasing burden of income support to offset the gains in productivity. The higher wages offered in other activities, and the more dependable conditions of employment (in comparaison with earlier periods) exercise a considerable pull, the effect of which is stronger, the smaller the agricultural sector becomes.

This reduction in the number of people working in agriculture is achieved at the cost of increasing capital intensity which is made possible through the quantitative development of the farm supply industries. Thus an increasing share of gross farm output must be reserved for paying for factors bought from other sectors of the economy, which further reduces the amounts available as net farm income. This process of accelerated technological progress also makes it more and more difficult, in an industry such as agriculture, which is made up of a large number of competing units, to avoid a relative decline of farm prices in real terms (worsening terms of trade). This becomes an additional causative force in accelerating the exodus from agriculture, or, at least, so it has been in the recent past of most countries. Moreover, the increasing size of the farm business and the increasing degree to which it is sometimes credit-financed leads to the result that a considerable and sometimes increasing share of agriculture's net value added goes to owners of capital many of whom do not belong to the population of the agricultural of sector.

The numbers of people engaged directly in farming reached their peak in most of the O.E.C.D. countries in the nineteen-twenties or later. Reductions in absolute numbers prior to that period were moderate where they occurred; for the most part they were occasioned by incidental circumstances (war, emigration) and are in part difficult to etablish from existing statistical sources.

In the United States, both manpower and effective employment (volume of job) in agriculture remained close to the level attained before World War I up to around 1930. This is in the country where productivity is on the whole highest and where productivity measurement is also most advanced. The parallel reduction both in manpower and in the volume of effective employment in agriculture got under way during the 1930's but has proceeded most rapidly during the 1950's; by the most recent reports, the magnitude of both measures is down to considerably less than half their 1910-1930 level. Canada has had a similar development with a somewhat later timing. In Europe some countries (including France and Sweden) have had a development that was nearly as rapid in relative terms, while starting from a lower level of productivity and a higher density of people on the land. In Western Europe as a whole, agricultural exodus over the 1950's has been accelerating and has averaged upwards of 20 per cent for the group as a whole during the decade, with hardly any country falling very far below the average (see Chapter I below).

Italy and Yugoslavia join the West European pattern especially since the mid-fifties. In Italy, there have been spectacular declines in the northern part of the country recently and considerable transfers of labour from south to north.

The Iberian countries and Greece show less evidence of structural change in the proportions between the main sectors of the economy. These countries still reflect - or, at least, did so until very recently - the phase of development where the highly industrialised countries were before 1930. Turkey, with still increasing absolute numbers working in agriculture, belongs as yet to an even earlier phase of incipient industrial development.

This outmovement of labour from agriculture has not only resulted in increased output per man. It has also been accompanied by increasing capital intensity. Current statistics on tractors, combine harvesters, commercial fertilisers, etc. show spectacular increases throughout the nineteen-fifties in Western Europe and less so in Southern Europe. In North America, the numbers of machines for field work were high already before 1950, but increasing qualitative improvement and specialisation have continued to raise their efficiency ; technological advancement now proceeds to reduce labour requirements also for horticultural crops and animal husbandry. As these lines of production are quantitatively even more dominant in Europe than in North America, the spread of such productivity increasing technologies in Europe will in the future cause further drastic reductions in the requirement for labour in agriculture, as well as corresponding further rise in capital requirements per worker employed in agriculture.

This sequence of events raises numerous problems some of which will be tentatively explored in this report.

The first question regards the measurement of manpower in agriculture. The size of the labour force committed to agriculture is seldom clearly evident, and even less clear is it how such data may be compared over time and between countries. Dual employment in agriculture and some other activity is wide-spread in several countries. Many people leave agriculture gradually and without changing their place of residence. Recent research in the United States indicates that dually employed persons move into and out of the farm industry much more frequently than can be surmised from census data and other information relating to a given point in time. Labour force participation rates of women, teenagers and older persons are often different in agriculture from what obtains in other industries.

The second main problem regards the volume of net income than can be expected to be generated in agriculture in the future, under stated assumptions with regard to population growth, rise in per caput income and demand, and changes in foreign trade in agricultural products. Productivity changes in agriculture also come in as a variable here because of the effect they tend to have upon the terms of trade in relation to other sectors of the economy. Given an estimate of the net income that can be generated in agriculture, we can from there make an estimate of the number of people who can be supported by agriculture, assuming that they should have a certain income level - either full parity of incomes with other sectors or, more likely in the majority of countries in the near future, a continuation of the parity ratios of the recent past.

The third main problem is in measuring the need for labour in agriculture. The income goals referred to in the preceding paragraph must be confronted by estimates showing that the agricultural production can be carried out by the reduced number of workers who can have those incomes. Measurement of the theoretical need at a given point in time (in the recent past) is not enough, because the dynamic sequence of changes successively introduces new savings of labour time. It is not overlooked that the problem of "labour requirement" has a somewhat different meaning in highly developed and less-developed countries and areas, but also for the latter there are not seldom peak seasons when the whole labour force is stretched; and projections for the future also necessitate some degree of anticipation of later phases when these countries will be more developed and their problems will show more resemblance to those of the highly industrialised countries.

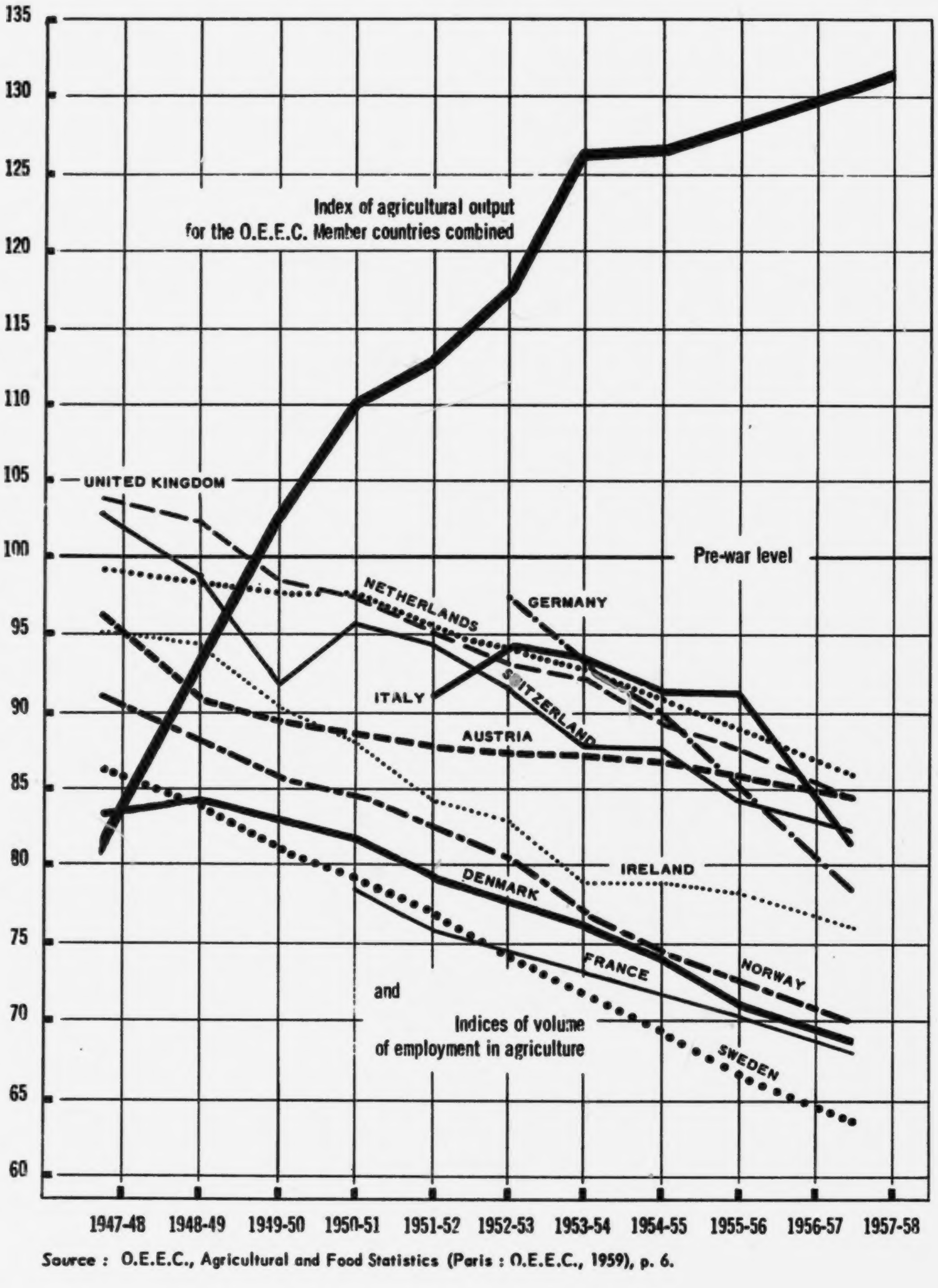
These lines of reasoning raise the question how long such a progress of change may continue, and also the question as to its ultimate significance for the welfare of the whole economic system.

Obviously, the farm labour force can never approach zero. Sometime in the future a low mark will be reached below which there cannot be much further reduction. An "indifference point" will be reached when the net income of farmers and farm workers represents only a minor part of the total value of the gross output of the industry. Cost savings by other means will then be more important than those by reduction in direct labour. Further improvements in total factor productivity, and in the net result for the community, will then hinge more and more on this aspect, and also on continued productivity development in the farm supply industries. In North America, some branches of field farming (e.g. wheat) are now so efficient that it is difficult to see how they could be much improved, as far as the use of direct labour goes, once the peak level of efficiency has been more generally attained. Many farm enterprises are however far from approaching this stage even in North America. In Europe situations of this type are as yet exceptional if they exist at all. For projections of a decade or two this point can on the whole be neglected, at least in Europe, even though it should be kept in mind as an ultimate limit on the trends to discuss.

A more obscure point in sometimes raised: What is the ultimate rationale for the substitution of machines for men in agriculture, when these machines have to be produced by other workers in factories ? Some reflection on the economic process of substitution should make clear that the substitution would not happen unless it were remunerative; given the fact that factory workers, generally, have higher wages than farm-workers, it follows already from this that the number of man-hours spent on producing farm requisites must be considerably lower than the number of farm labour hours made redundant through these requisites. Such inquiries as have been made into this subject indicate that the advantage to society through the substitution process is by no means inferior to that indicated by conventional productivity analyses (see below in Chapter 2, and under the United States and Denmark).

Granted that acceptable measures can be found of the supply of and the requirements for farm labour, a plan target for the transfer of labour from agriculture to other industries cannot be directly equated with the present or anticipated difference between the two. Structural obstacles in age distribution, farm sizes and fixed capital, as well as cultural and psychological factors, will almost always make the mobility of labour less than would be required if the entire surplus were to leave over a short span of time. Higher price and increased scarcity of farm labour will also contribute to reduction in the cultivation of low-productive land, a change that is under way as a general consequence of rising factor productivity. The variable incidence of such change, as between regions in a country, will give rise to intricate problems of regional economic planning. These factors must of course be kept present in any attempt at estimating future farm labour force and the number of workers that may become available for employment elsewhere.

AGRICULTURAL PRODUCTION AND EMPLOYMENT IN AGRICULTURE
Pre-war = 100



Source : O.E.E.C., *Agricultural and Food Statistics* (Paris : O.E.E.C., 1959), p. 6.

Chapter 1

THE AGRICULTURAL LABOUR FORCE AND ITS CHANGES

To analyse trends of change, we need well defined statistical concepts allowing comparaison over time as well as between countries. Census and survey data on persons active in agriculture do not always reflect unambiguous facts, nor are they always easy to interpret. The size of the agricultural work force is subject to considerable variation according to judgment and definitions, and also according to incidental circumstances such as the date of enumeration or the period of reference. The ways in which the highest degree of consistency and comparability may be attained are discussed in Appendix No. 1.

1. Changes in total active population in agriculture

Trends of change in agricultural work force over recent intercensal periods are shown in Table 1. In each case the concept was chosen which was judged to be the least ambiguous or inconsistent. In a few cases, more than one concept is represented in order to illustrate the consequences of using alternative concepts. For the general picture of trends of change in the post-war period, see also Chart 1.

The highest annual compound rate of decrease in any country over as long a period as a decade is that in the United States 1950-60. Canada and several countries in Western Europe have had decennial rates of decrease around or over 3 per cent per year. It is characteristic of this phase of change that the rate tends to accelerate up to a point, as exemplified by the French data. Such was also the case in the United States previously, and the rate shown for the 1950's is not likely to be maintained there in the future. It is equally characteristic that the rate of decrease tends to be lower in an earlier phase, as shown in the table from Spain and as can also be illustrated from earlier periods in the United States, France, Italy, and other countries. It is also in keeping with what we could expect when the agricultural population or work force is nearly static when

Table 1 : Population active in agriculture and its change in recent years

(Data in thousands, 000's omitted)

Country	Concept	Period	Number at :		Compound annual rate of change (per cent)
			Beginning	End	
Austria	Male, permanent, all ages	1951-61	609	482	- 2.4
Canada	Civilian labour force	1951-61	939	674	- 3.3
Denmark	Man-years	1949-50 59-60	397	300	- 2.9
France	Male, 15-64	1946-54	3,387	2,958	- 1.7
	Male, 15-64	1954-62	2,958	2,308	- 3.1
Germany	Male, 14-65	1956-60	2,685	2,177	- 3.0
Greece	Male, all ages	1951-61	1,152	1,185	+ 0.3
Ireland	Male, 14 and over	1951-61	453	381	- 1.7
Italy	Male labour force	1956-61	4,908	4,125	- 3.5
Netherlands	Male, under 65	1947-60	490	330	- 3.1
	Man-years	1950-60	587	431	- 3.1
Spain	Total, all ages, both sexes	1950-60	5,237	4,631	- 1.2
Sweden	Male, 15-65	1950-60	518	364	- 3.6
Turkey	Male, 15-64	1950-55	4,390	4,581	+ 0.9
	Male, 15-64	1955-60	4,581	4,860	+ 1.2
United Kingdom	Male, under 65	1951-61	1,087	930	- 1.6
United States	Both sexes, all ages	1950-60	6,860	4,085	- 5.2
	Male, 14-64	1950-60	5,620	3,231	- 5.7
	Male, 20-64	1950-60	4,961	2,842	- 5.7
Yugoslavia	Male, 15-64	1953-61	2,792	2,406	- 1.8

Sources : Population census reports and statistical yearbooks, and other material quoted in the country chapters (below).

it is about half of the total for the population of the country (as in Greece), and that it increases in absolute numbers when it is a large majority (as in Turkey). Particular circumstances not directly related to this line of reasoning have influenced the rates shown from Ireland and the United Kingdom.

2. Age distribution and size of total exodus

The outflow of people from agriculture is not necessarily a a continuous process. Certain age strata are more likely to leave than others, and this differential propensity to leave is further modified by the individual's position within the industry. As a consequence, the composition of the agricultural work force by age and sex is often not a typical cross-section of the population or of the active population at large. Further complications are introduced when the composition by age and sex has been influenced by war losses or other incidental circumstances.

Study of the tabulations by age, as shown in several of the country chapters, indicates as expected that most of the exodus has been among the young age strata. Less easy to anticipate is the fact that in several countries also middle-aged persons have left agriculture to an extent which is significant even though lower than the rate of exodus of the young. This has been the case above all in countries where the rate of exodus from agriculture has been particularly rapid. Foremost among these is the United States. With a rate of exodus exceeding 5 per cent per year over a decade, the country's farms would have been almost completely drained of youth, had it not been for the fact that a substantial part of the exodus was composed of middle-aged workers. To some (although minor) extent this may have contributed to the unemployment problem in the country. Also in other countries with a rapid rate of exodus, such as France and Sweden, considerable numbers of middle-aged persons have left agriculture, even though not quite on the scale as in the United States. In countries where the number of wage workers has declined particularly rapidly, as for instance Germany, this part of the exodus has not only been that of young people but also of many middle-aged individuals.

The indirect effect which the recent exodus has upon future size and age distribution of the work force in agriculture is therefore in several cases less pronounced than it would have been if the exodus had taken place exclusively among the younger age strata.

In certain countries, information on the age and sex distribution of the agricultural population or work force has been used to estimate the size and composition of the population active in agriculture at some date in the future, usually around 1970 (see below). By the same technique it was also possible, in some cases, to estimate the size and composition of the population active in agriculture around 1960 on the assumption that there had been no exodus in the most recent intercensal period. The total exodus - including the implied one of those young people who belonged to an agricultural household but never entered upon an agricultural career - is not necessarily the difference between the number at the beginning and the end of the period. It may be larger or smaller, due to the age composition of the agricultural population at the beginning of the period.

Among the countries investigated in this manner Denmark, France, the Netherlands and Yugoslavia had a positive growth potential in their agricultural population at the beginning of the most recent intercensal period. The implied exodus is therefore in these cases greater than the difference between the number at the beginning and the end of the period. In Sweden and the United Kingdom this was not the case; the implied exodus in these countries was close to the actual diminution in the agricultural work force. In the United States the situation appears to have been similar, even though less clear in detail.

Our interest here is not only concentrated on a reduction in the agricultural labour force to proportions which are most suitable from the viewpoint of agriculture as a branch of production, but also on the desirable recruitment of workers to other industries (or, on the undesirable recruitment of unemployed, as the case may be). The total implied exodus may thus be shown both as a percentage of the agricultural labour force remaining at the end of the period, and as a percentage of total labour force in the country at the end of the period (see Table 2). Since the percentages refer to numbers remaining at the end of the period, it is not appropriate to show them as compound rates of change.

Table 2

Implied exodus from agriculture in recent years, in selected countries, as per cent of agricultural and total work force at the end of the period shown

(All figures are estimated and represent crude magnitudes only)

Country	Period	Implied exodus from agriculture as per cent of agricultural and total labour force at the end of the period	
		Agricultural	Total
Denmark	1950-60	40-50	7-8
France	1954-62	32	6
Netherlands	1947-61	50+	6-7
Sweden	1950-60	45	5
United Kingdom . . .	1951-61	17	1
United States	1950-60	40-45	3
Yugoslavia	1953-61	35	17

The table illustrates ths striking difference in scope between labour leaving agriculture and labour entering other industries and the differences between countries in this respect. Obviously, the same percentage reduction in the active population in agriculture means a smaller addition to the non-agricultural labour force, the more industrialised and urbanised the country is.

It should be further pointed out that labour leaving agriculture and labour arriving in other sectors are not necessarily the same number. Agricultural labour has here been taken in the sense of the definition proposed in this report : men aged 15–65 plus a generally proportionate contribution to farm work made by women, teenagers and older men. Since labour force participation rates of women in many countries are higher in urban areas than in agriculture, it is quite possible that the labour supplied to other industries is somewhat more numerous than the labour withdrawn from agriculture, or at least differs from it in composition by age and sex. The percentages in the first column should thus be read against data for total agricultural labour force at the end of the period. Those in the last column, on the other hand, should be interpreted against data on total labour force by age and sex. (1)

3. Farm operators, farmers' sons, and hired workers

One of the characteristic features of the recent exodus from agriculture is, as could be expected, the fact that the number of hired workers has been diminished more rapidly than that of family workers (farm operators and farmers' sons working at home). Such has been the case above all in the United Kingdom, the Benelux countries, Germany, and Scandinavia, to a lesser extent also in the United States (see below). France and the Mediterranean countries present a partially different picture which requires some discussion.

The decline of the hired work force has meant least of a problem in the United Kingdom, where this category previously was a large majority of the agricultural labour force. Its reduction has taken place mainly by substitution of capital goods for labour on existing farms many of whom continue to hire some labour although less than before. In Germany, the Benelux countries, and Scandinavia, the acute shortage of wage workers in agriculture has led to a situation where farming not only is more decidedly a family-scale industry - this is so in most O.E.C.D. countries - but where most farmers have to do without any hired workers at all, a situation wich places the focus of future change on changes in the family-scale farm structure itself. The same is also the case in the United States - and even more so in fact than in appearance. It was shown recently that the share of family-scale farming in total marketed output from United States agriculture has increased over the 1950's, and it is clear that many of the most high-productive farming areas of the country use less hired help than previously, as a result of advanced mechanisation. Yet this result would have been even more apparent if it had not been for the dissolution of part of the cropper system in the south. In no country is there any evidence of any important trend towards farms with 4, 5 or more hired workers. The problems associated with the smallest size classes of farms come sharply into focus.

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(1) See for instance "Demographic trends 1956–1976 in Western Europe and the United States, Paris (O.E.E.C.) 1961.

In France, too, hired workers have decreased somewhat more rapidly than family workers. The resulting age distribution is different, however, indicating relatively more exodus of middle-aged persons from the ranks of the hired workers than from the family workers (most of whom are farm operators in these ages), which is as could be expected. It is thus possible that a further ageing the French farm labour force (if this happened without further exodus) would again bring some increase in the relative share of hired labour. The situation appears to be essentially similar in Italy. Also in Spain there has been some exodus of middle-aged workers, which rather indicates exodus of wage workers.

At least in France, this situation is connected with a more rapid exodus of unpaid family workers (farmers' sons working at home). The whole situation raises the question whether there has not been a certain amount of transition from one category to another : smallholders who previously considered wage work for other farmers as a side line may now find the latter so remunerative as to count it as their principal occupation. Outright increase in the number of agricultural wage workers in Greece may well have the same kind of explanation.

The question about the social identity of the agricultural wage worker goes even further. In Denmark, to a lesser extent also in Sweden, it has been customary for farmers' sons to work away from home, on another farm, for some time as a kind of apprenticeship. The same may take place to some extent in still other countries, and it would be interesting to know whether this is on the increase or not.

Whatever the answer to this question, the formulation of it serves to remind of the fact that the strength of a "generation pressure" for the succession of farm operators is not necessarily confined to the latter and their sons working at home. When the number of unpaid family workers on farms remains large in relation to farm numbers, as in Germany, then the generation pressure is obviously relatively high. But the opposite does not necessarily follow in the reverse situation. Small numbers of unpaid family workers, as in the United States, or sharply declining ones as in France and some other countries, would reflect a low generation pressure only in the case that inheritance were the chief avenue of access to a farm. Where renting is widespread, as it is in those two countries and several others, advancement of wage workers along the "agricultural ladder" through leasehold cannot be disregarded and least of all for the future.

4. Dual employment

The preceding treatment has made no mention of dual employment in agriculture and other activities.(1) It is known to be important in several countries, but not much more is known about it.

Both scope and trends are varying. In the United States, about one third of all farm income is derived from non-farm sources, and numerous are the farm operators for whom dual employment is either a way to enter agriculture or a prelude to leaving it. Dual employment is perhaps even more widespread among the hired farm work force in the United States ; it appears that of all those who do wage work in agriculture, only a minority do no other work at all.

In Europe, non-farm activities have been important among small-scale farmers in Germany but is reported to be less important now, partly because many of the dual-employed have ceased to do any significant amount of farming. In Italy, dual employment is important in some of the most industrialised areas in the north and appears, if anything , to be increasing. In Denmark, which traditionally was a country with almost only full-time farmers, dual employment has begun to increase, even though it still absorbs only two or three per cent of the time of the agricultural work force.

For any estimate of farm labour force and labour input in agriculture dual employment presents intricate problems of measurement, so much the more so as data on "man-years" which give the best measure of volume of labour input are not suitable as a basis for projections of future numbers. In the present context, however, dual employment serves to remind us of the fact that the question of

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(1) Dual employment refers to wage workers as well as farm operators. Employment in agriculture partly on own farms and partly for wages on other farms is not regarded as "dual"from the viewpoint of the agricultural industry.

"leaving agriculture" is sometimes one of degree rather than a sudden change in a person's whole situation. For one thing, a dually employed person often has some competence in another profession, and also some experience of the possible alternatives. Secondly, even if he has an investment in agriculture, dual employment often makes it possible to maintain it while exercising another profession. In extreme cases, farm operators may have many if not all parts of the operation of their farms done by contract services. The only agricultural function a farm operator then retains is that of a manager, which does not preclude full-time work in a different occupation. Cases of this extreme are known from Sweden and the United States (always in connection with cash crop farming with no animal husbandry) and may exist elsewhere too.

Whether dual employment is a desirable feature or not depends on whether it promotes or hampers the adjustment of agriculture towards optimal patterns of resource use.

5. Projections assuming no further exodus

As a first approximation of the magnitude of the scope of future movements of workers out of agriculture, it was of interest to project the size of future labour force on the assumption of no further exodus. How many workers would there be in agriculture in 1970 if exodus had stopped in 1960 and the male children of the agriculturists were all to follow their fathers' calling ? The question may sound as if it had no bearing upon reality ; but then it is raised merely to provide a yard-stick of total future exodus, including implied exodus of young people.

In some cases past exodus has been so strong that there would follow a continued decline up to 1970 merely as a consequence of the ageing of the work force around 1960. Such is the case in France, where the young age strata have already left to such an extent that a direct projection up to 1972 would show about 100 thousand workers less than in 1962. The decrease is slight however and might be offset later if there were no exodus thereafter. Also in Italy the impression is that there would be continued decrease up to 1970 merely because of the ageing of the present work force.

In some countries the opposite holds, however. The "no-exodus" assumption would lead to a resumed increase in the agricultural population and work force. This is the case not only in countries with high birth rates such as the Netherlands and Yugoslavia. It would also be true where the teenage population has not yet been thinned out to any great extent. It is a characteristic feature of the age distribution of the agricultural labour force in most countries, that it has a higher percentage of the total labour among the oldest and the youngest. The teenagers are the children of the middle-aged and older people and do not yet migrate on their own, at least not in the same degree as the young adults. Maintaining all the teenagers and young children within the agricultural population would therefore mean a certain reversal of the trend.

Such a reversal is not very likely to come true ; there has been no case to such effect in the recent past.

6. Trends of the future

The degree to which the agricultural labour force will actually be reduced (or increased, as the case may be) in the future depends, of course, on the relevant economic motives and how they square with the structural and socio-psychological factors at work ; all of which will be treated in the following chapters. At present we should only discuss the demographic and directly related factors which are likely to influence the scope of further exodus or expansion. We must not forget that people may also move into agriculture from other lines of work as is already happening in the United States and may well become normal in the future also elsewhere.

A main clue is in the characteristic age distribution which results from a recent wave of exodus mainly of younger farm people. As the population ages, the number of farm operators will be reduced, the young adults move into the position of farm operators. As they do so, they are fewer than the farmers they replace. For this reason alone, farms are getting fewer and larger. There are of course other reasons for this too, but already the fact of a low generation pressure - if that is the situation - leads to that result. Where the generation pressure is higher, the reduction in farm numbers may not come about, at least not for this reason, and the chief source of further diminution in the number of farm workers is then in the continued decline in the number of hired workers.

Once the decrease in farm numbers has followed as a consequence of low generation pressure, this would to some extent bar the road to the even younger members of the farm families as they move up to the young adult ages. They will not find enough opportunities among existing farms and this supplies a good motive for seeking another kind of employment. For this reason, the age strata which are at present in their teens or younger are not likely to remain a larger fraction of the total than those who are now young adults. As farm youngsters mature, they will experience the same pressures, direct and indirect, as others before them to ponder the pros and cons of an agricultural career.

It is therefore not very bold to suggest that in normal cases, the agricultural population of the future can be projected - as a maximum - to be the fraction of total population now significant among the young adults, say, those between 20 and 30 years of age.

As this fraction is often substantially lower than average (for details see the country chapters), this suggests the likelihood of a future decline of - at least - the scope indicated by the low fraction now represented by agriculture in these age strata.

This leads of course only to a minimum estimate of future decline. In practice there is nothing to prevent continued exodus also of the younger age strata in a way that further reduces the fraction they are of the total. In the past, such exodus as there has been, has sometimes reduced the share of agriculture in the young adult population of the country to two-thirds or even half of what was the case previously, in as little as a decade. The population censuses taken around 1960 indicate no case where an analogous development over the next decade would be impossible or disastrous.

Chapter 2

FUTURE FARM LABOUR FORCE IN RELATION TO THE GROWTH TARGET AND FUTURE FARM INCOME

1. Theoretical considerations

In order to better interpret past trends and also in order to judge how far they may be expected to continue in the future, it is necessary to analyse, in theoretical terms, the forces that make for a change in the number of persons and workers who can derive a living from agricultural production. The question of the number needed, for technical reasons, is discussed in the next chapter. The following six factors may be listed here, keeping in mind that they are all inter-related with each other.

(a) Change in demand for food and other agricultural products, resulting from demographic change in combination with the level of income elasticity of demand for these products ;

(b) The trend in per caput income in the country in general ;

(c) The degree of capital intensity in agriculture required to produce what is needed to meet effective demand for agricultural products ;

(d) The trend in productivity change (including such caused by changes in organisational structure) as a motive for factor/factor substitution ;

(e) Changes in terms of trade of agriculture, as a result of all the above factors plus national price policies and/or world market trends ;

(f) Changes in the degree to which farmers own the resources they use (changes in net worth) and hence the degree to which agriculture's value added becomes net income of agriculturists.

Still other factors have some influence upon the incomes of agriculturists. Luxury production may, despite its generally limited scope, have a sizeable influence in areas where it is successful, and escapes the general limitations of demand elasticity for farm products. Increasing functional specialisation tends to remove many functions from the farms, unless they are recaptured by engagement (by farm people) in part-time employment in activities such as processing, packaging, and distribution of farm products, whether by co-operative arrangements or otherwise. Non-agricultural incomes do of course also modify the income situation ; but whether they come from dual employment or from social-security or kindred payments, they do in fact represent a disguised exodus from agriculture. Several types of action designed to halt exodus from agriculture are of uncertain effect. Thus programmes for better professional training (in agriculture) of farm youth, if applied generally, would hardly have the desired effect on incomes, unless accompanied by measures to avoid chronic over-supply of the higher-qualified agricultural labour force.

The possible effect upon agricultural incomes of higher price supports (if such were put into effect) is disregarded here, since it is assumed that changes in this direction are undesirable.

In the following, the incidence of these factors is discussed in relation to the O.E.C.D. ten-year growth target for 1960-70, which aims at an overall increase in national income, jointly for the 20 Member countries, of 50 per cent in these ten years. (1)

The level of the target is in fact crucial for the reasons that follow. (2) That fifty per cent growth, above the income level of

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(1) Cf. "Policies for Economic Growth. A report prepared by the Economic Policy Committee", Paris, O.E.C.D., November 1962.

(2) If the target were reached in 8 years, this would mean more than 5 per cent annual rate of growth, or between 3 1/2 and 4 per cent growth in per caput income for the group as a whole. As food demand still would grow only by about 1 1/2 per cent per year, this would mean that food demand could grow only by some 13 per cent and farm net income by 10-11 per cent in the same eight years. If on the other hand the target were reached only after 15 years, this would require only 2 3/4 per cent annual growth 1 1/4 per cent per caput per year. Growth of agricultural income could then be achieved merely by satisfying the expanding demand, without any significant reduction in the farm work force - as far as growth and income targets were the only factors of significance. Changes in productivity and in terms of trade could make themselves felt rather independently of the rate of growth in production, as could also changes in resource ownership.

1960, will eventually be achieved, is hardly in dispute, and some minor variation of a year or two in the timing of its attainment would cause only minor modifications in the conclusions that follow.

The general relation between growth of population and output may of course be considerably modified by a country's policy with regard to international trade in agricultural products. It must be admitted, however, that this presents more manageable policy alternatives for the importing than for the exporting countries, and for the latter mainly for the smaller ones. For the O.E.C.D. countries as a group, no dramatic changes in the overall import-export situation are in sight. The Member countries, between themselves, produce over one-third of the world's entire agricultural output and they also have, between themselves, the bulk of all international trade in agricultural products other than tropical specialities. For an aggregate of this size and economic situation, only gradual expansion can be envisaged, and the same holds in practice for the larger among the exporting countries in the group.

We will therefore first discuss the probable trend for the O.E.C.D. membership as a whole (as if their trends were analogous and the proportions between them and their agricultural industries were to remain unchanged) and thereafter the possible inter-country differences in trend and achievement.

As a general proposition it is assumed that, over a period such as a decade, the existing disparities between farm and non-farm incomes will not disappear. In the recent past these disparities have, if anything, tended to become somewhat wider in most countries. For the sake of simplicity it is, rather, assumed that the degree of disparity will remain more or less as it is, but that the farm sector should not slip further behind in relative income. In other words, it is assumed that farm incomes ought to grow at the same rate (in percentage terms) as other incomes.

(a) Growth in the demand for food, etc.

In the O.E.C.D. group as a whole, this growth in demand chiefly reflects population growth. Higher demand elasticities are obtained in the Mediterranean countries, but most members of the group have rather low elasticities, and demand for food can therefore not expand much faster than population growth.

Between 1950 and 1960, the aggregate population of the O.E.C.D. countries grew from around 470 to around 530 million, or by 12 per cent (1.1 per cent per year compound rate). For the decade 1960-1970, population growth may be slightly more rapid but not much, say, 13-14 per cent over the decade (or at 1.2 - 1.3 per cent per year) for the group as a whole. Growth in demand for food may then be somewhat higher than 15 per cent but will certainly be well below 20 per cent. For North America, growth in demand was recently estimated at 2 per cent per year while in European countries the rate of expansion in demand for food would vary between 1 and 2 per cent, according to the conditions of the country. For the whole group, we may reckon with a rate of growth in the demand for food of 1.5 per cent, or a little more, per year.

In recent time, agricultural production in the O.E.C.D. countries has actually risen somewhat more rapidly than could correspond to the anticipated rate of expansion in demand for food in the countries of the group. In the whole O.E.C.D. group, growth in agricultural output has been of the order of 1.7 to 1.8 per cent per year, both over the last 6 - 8 years and over the longer term period since the 1930's. Recent expansion of output in North America has been slightly lower than the rate of population growth, which ought to lead to a slow reduction in the tendency for surplus production to accumulate - in relative terms, at least. In the European O.E.C.D. countries, by contrast, agricultural output in recent years (and also since the 1930's) has expanded a good deal more rapidly than population or effective demand, thus lessening the dependency on imports - again in relative terms. The margin for manoeuvering supply and demand by alternative trade solutions has thus narrowed down, both between countries of the group and in relation to the rest of the world.

(b) The trend in per caput income

Rise in per caput income throughout the economic system will tend to affect the farm labour force situation through the combined effect of the pull from the non-agricultural labour market and of the improved rate of substitution of capital for labour which is a consequence of rising wage expectations of agricultural workers. This influences not only the agricultural wage workers but also, if to a lesser extent, underemployed farm operators and their family members, especially if they already have some experience of non-agricultural part-time employment.

The magnitude of the pressure to change that comes from this source can be roughly equated with the difference between the rate of growth in per caput income and the rate of growth of net value added in agriculture. If the rate of growth in national income were low enough to equal the sum of the rate of population growth and rate of increase in agricultural net value added (as determined by the demand for agricultural products) - then, apart from the factors discussed in the following, it might be possible for agriculture to follow the slowly rising level of per caput income merely by catering to the expanding demand for agricultural products, without having to contract its labour force.

In the case at hand, we assume overall growth of 50 per cent over 10 years, that is by 4.1 per cent per year, and only about 13 per cent population increase and perhaps an annual rate of increase in the demand for agricultural products of 1.5 per cent per year. Per caput income will then go up by 32 per cent in the ten years, or by 2.8 per cent per year (4.1 - 1.3 = 2.8).

If the agricultural population is to see its per caput income rise at the same pace, then only part of this rise can be derived from increased agricultural production, say 15-16 per cent in the aggregate or rather less (see the next point). Without any exodus from agriculture, per caput income in the sector would grow only half as fast as that of the community at large, unless its terms of trade were improving correspondingly (an unlikely assumption, see below).

(c) The degree of capital intensity in agriculture

The degree to which agriculture requires capital - and particularly capital goods which must be purchased from other sectors of the economy - will normally not remain unchanged when gross output goes up. A given increase of output will, of itself, generate only a somewhat smaller amount of net value added than was the case with the average of all output previously. This becomes particularly true when output per man is raised by means of reducing the farm labour force, when all on part of the labour removed has to be substituted for by capital.

This can be studied by comparing the ratio of value added per man in agriculture with total ("farm-gate") output per man working in agriculture. As is easily shown, this percentage is generally lower, the larger the output per man. Country data do not permit any very precise estimate of the connection between the level of output per man and the percentage claimed by "external" costs. The latter come out differently if transfers within the sector are netted out, and also as a consequence of a number of other conceivable variations in the mode of computation.

In recent years (mid-1950's) external costs have claimed 50-60 per cent of the value of gross output of agriculture in the United States and Canada, and ratios generally between 30 and 50 per cent in countries in Western Europe. In the former countries, the volume of output per man in the years under survey has been on the magnitude of 5,000 or more "international wheat units" ; in western Europe, figures between 1,000 and 3,500 such units prevailed. The level of external costs in relation to value added is particularly high in the United Kingdom with its large imports of stockfeed and live animals. In southern Europe, with output generally between 500 and 1,000 wheat units per male worker in agriculture during the period studied, external costs claim only between 10 and 20 per cent of the output volume. Detail is shown in Chart 2. (1)

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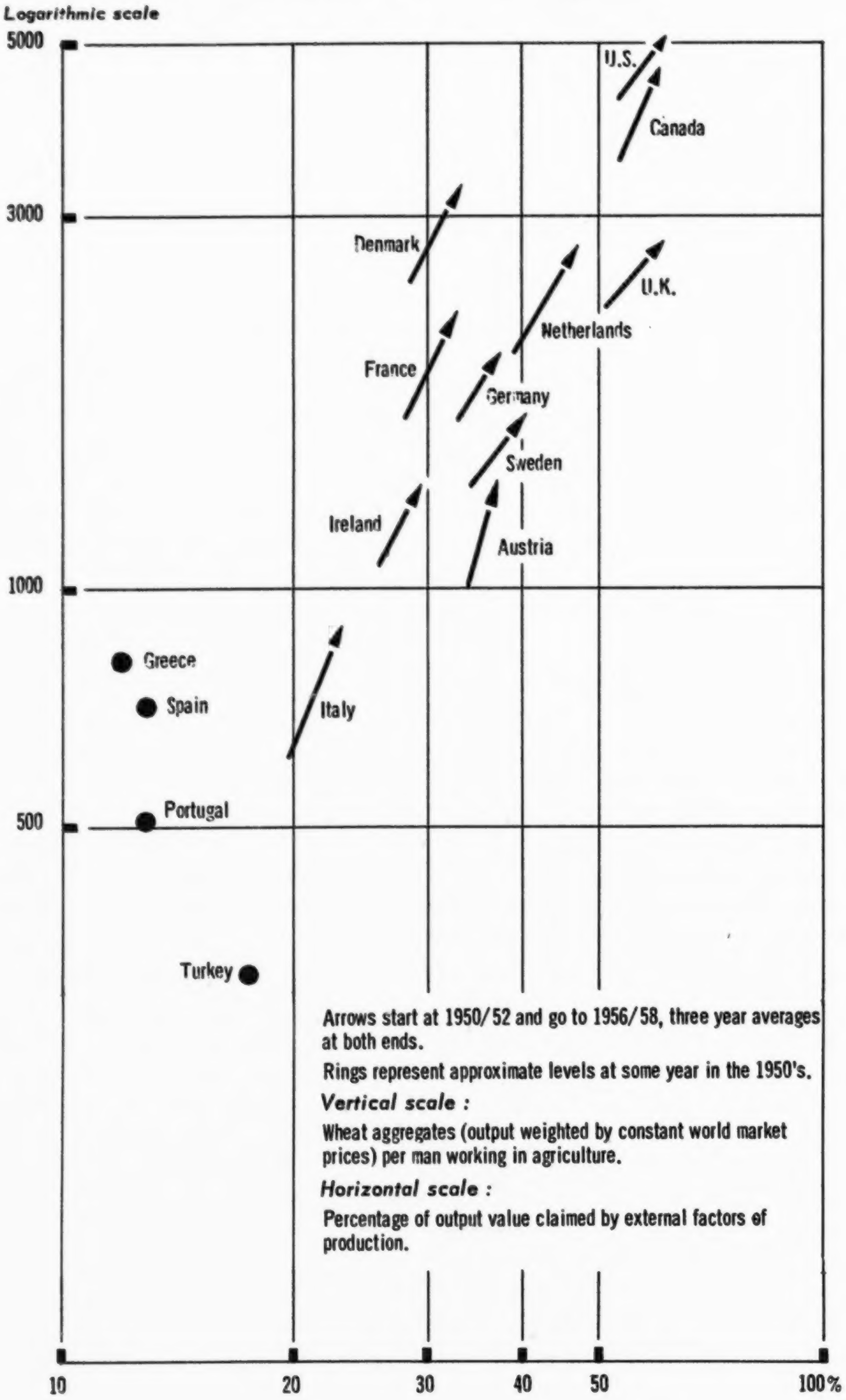
(1) See also "Towards a capital intensive agriculture. Output and expenses in European agriculture", fourth series. Geneva (UN/FAO) 1962.

OUTPUT PER MAN AND CAPITAL INTENSITY (SHARE OF OUTPUT CLAIMED BY EXTERNAL COSTS) IN SELECTED COUNTRIES



Arrows start at 1950/52 and go to 1956/58, three year averages at both ends.

Rings represent approximate levels at some year in the 1950's.

Vertical scale :

Wheat aggregates (output weighted by constant world market prices) per man working in agriculture.

Horizontal scale :

Percentage of output value claimed by external factors of production.

Generally, rises in per caput income in agriculture have been accompanied by increases in the share of output claimed by external costs. This is true even - and in fact particularly - in a country like Sweden where rises in per caput farm income have been achieved without any significant increase in output ; the particularly rapid exodus from agriculture which is necessary for this method of improving farm income requires, if anything, an even more rapid stepping up of the rate of investment and the capital intensity per worker. Without attempting to derive a precise function which would be difficult on the basis of the material at hand, it can be said as a rule of thumb that a given increase in the per caput income in agriculture will require a rise (in per cent) in the gross (farm-gate) agricultural output per man which is larger than the income rise by one-tenth to two-tenths. A rise in per caput income of 32 per cent over ten years, as discussed here, will then require a rise in output per man of around 35 to 40 per cent. When overall output is not allowed to rise more than 1.5 to 1.6 per cent per year, then the agricultural labour force should go down by about 1.5-2.0 per cent per year or by 15-20 per cent over the ten years for this reason alone.

(d) Technological progress and increase in productivity would cause some labour to be shifted out of agriculture even independently of income goals and production targets. This source of change cannot be measured independently (except by direct extrapolation of past trends) but must be kept in mind as part of the explanation for the changes which have occurred in the past as well as for those that are likely to occur in the future.

(e) The terms of trade of agriculture have been generally deteriorating in recent years. This would in fact be expected form the trend of technological change and productivity increase, which should lead to a lowering of the marginal value product of labour under given circumstances, thus calling for gradually changing input proportions to correct for it. (1) More particularly, it needs to be pointed out that the level of productivity in agriculture is more variable, between firms and regions no less than between countries, than is the rule in most other industries. As the improving rate of substitution is allowed to function in some sectors or on some farms, the inherent tendency towards excess production comes to light, and the resulting over supply becomes a drag on price formation. If in no other way, this works by a tendency for agricultural prices not to rise at par with the general inflationary tendencies of the modern world. This is how farm prices have declined in real terms in the United States, despite price supports : as the floor of currency value slowly caved in, farm prices were supported on that floor, but they were not systematically raised to compensate for the lowered purchasing power of the dollar.

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(1) Cf. ibid, Part 1, p. 5, with reference to "European Agriculture in 1965" (FAO/ECE, mimeo).

All of this taken together more than explains the reduction of agricultural labour force in the recent past. It also allows us to expect that declines similar to those of the recent past in the most advanced countries will become more general among industrialised countries form 1960 to 1970. Decreases of lesser magnitudes can be expected in the Mediterranean countries (other than Italy, which now belongs to the highly industrialised group), except possibly Turkey.

(f) A trend towards larger farm debt and higher rates of renting is again visible in some countries, as a reversal of the post-war tendency, based on inflation, which in many cases had improved the financial position of farmers. To the extent that such trends gather momentum, they will of course, lead to a situation where an increasing amount of agriculture's value added goes to net income among non-farmers, and a lesser share goes to farmers. This trend is likely to play a part in the near future, especially as the farm enlargement movement gets under way and necessitates more extensive credit financing. Rising land prices tend to sharpen this problem. At present little can be said about its scope, except that it may further underpin the conclusions drawn above from the other factors.

2. Agriculture's share in national income and labour force

The net result of the factors mentioned above under (a) through (e) [but not of (f)] can be studied in summarised form on the changes in the share of agriculture in national income and labour force. National income in this case is analysed on current prices to allow for the effect of changes in relative prices. The rate of decline of agriculture's share in national income can then be compared with its rate of change in the labour force. Table 3 gives these indications for those countries for which they were available or could be readily estimated.

All the figures in this table are of course approximate and are subject to the limitations of the sources from which they are drawn. A few among the labour force data have been estimated by interpolation and are so indicated by an asterisk, which then also applies to the ratio of change in column 6.

Table 3

The share of agriculture in national income and in labour force, 1950-60, selected O.E.C.D. countries.
Listing in ascending order of the percentage in Column 1

Country	Factor income of agriculture (in current prices) as per cent of national income		Agricultural labour force as per cent of total labour force		Ratios :	
	1950	1960	1950	1960	2/1	4/3
	1	2	3	4	5	6
United Kingdom	6.0	4.1	6.75	4.4	.68	.65
United States	6.9	4.1	11.5	6.0	.59	.52
Germany	11.3	6.2	23.2	14.1	.55	.61
Netherlands	12.4	10.1	17.50*	12.0	.82	.68
Canada	14.6	6.8	19.7	10.5	.47	.53
Austria	15.4	11.6	25.0	19.4	.75	.78
France	16.2	9.7	30 *	23.1	.60	.77*
Denmark	20.9	14.5	29.5	17.8 *	.69	.73*
Portugal	29.1	25.4	52.8	..	.87	..
Italy	29.2	17.8	40.3	30.1	.61	.75
Ireland	31.9	25.8	47.0	37.1	.81	.79
Greece	36.0	30.0	49.3	46.3	.83	.94
Turkey	42.7	41.3	70-75 *	70-75 *	.97	1.00*

Sources : Col. 1-2 from United Nations, Yearbook of National Accounts Statistics, and United Nations Statistical Papers, Ser. H, Statistics of National Income and Expenditure.
The concept is Gross domestic product at factor cost in most countries, Gross domestic product at market prices in France and Germany, and Net domestic product at factor cost in the United States.
Col. 3-4 national statistics, both sexes in Canada, Germany and the United States, male workers only in other countries, in general limited to males aged 15-65 or similar limits as indicated in country notes.
Note that the effect of price supports and other indirect supports are included in the income figures, while cash subsidies are not.

The relative income position indicated by comparison between columns 1-2 on the one hand and 3-4 on the other is further subject to the limitations that cash subsidies, taxation, ownership position and various other built-in modifying factors make the real relative income different from what can be surmised from national income data. Apart from the trend in farm debt, as mentioned above, there is of course also the volume of farm debt and the share of net value added which for this kind of reason may go to non-farm owners of farm capital.

With these reservations in mind, the table still tells certain things of interest. The lowering of agriculture's share in total factor income has on the whole been sharpest where it was already small, and vice versa. The Netherlands and Italy are the exceptions, one in each direction. That agriculture's share should fall more slowly when it is large is logical; in this situation agriculture itself, with its obvious difficulties of growing very rapidly, carries a higher weight in the total which therefore also changes more slowly.

The decline in agriculture's share in labour force has on the whole been remarkably parallel to that of its share in national income, as shown by a comparison between columns 5 and 6. The parity ratio would appear to have improved considerably only in the Netherlands ; it was to have remained on the same level (more or less) in the United Kingdom, the United States, Canada, Austria, Denmark, Ireland, and Turkey ; and there appears to have been a loss of parity above all in France and Italy, to a lesser extent also in Greece and Germany. In both France and Italy this is logical as a consequence of very rapid industrial development starting from a level where agriculture still held a large share in the economy ; the widening disparity is then understandable as a backlog of agricultural development which may be corrected through more rapid agricultural exodus later.

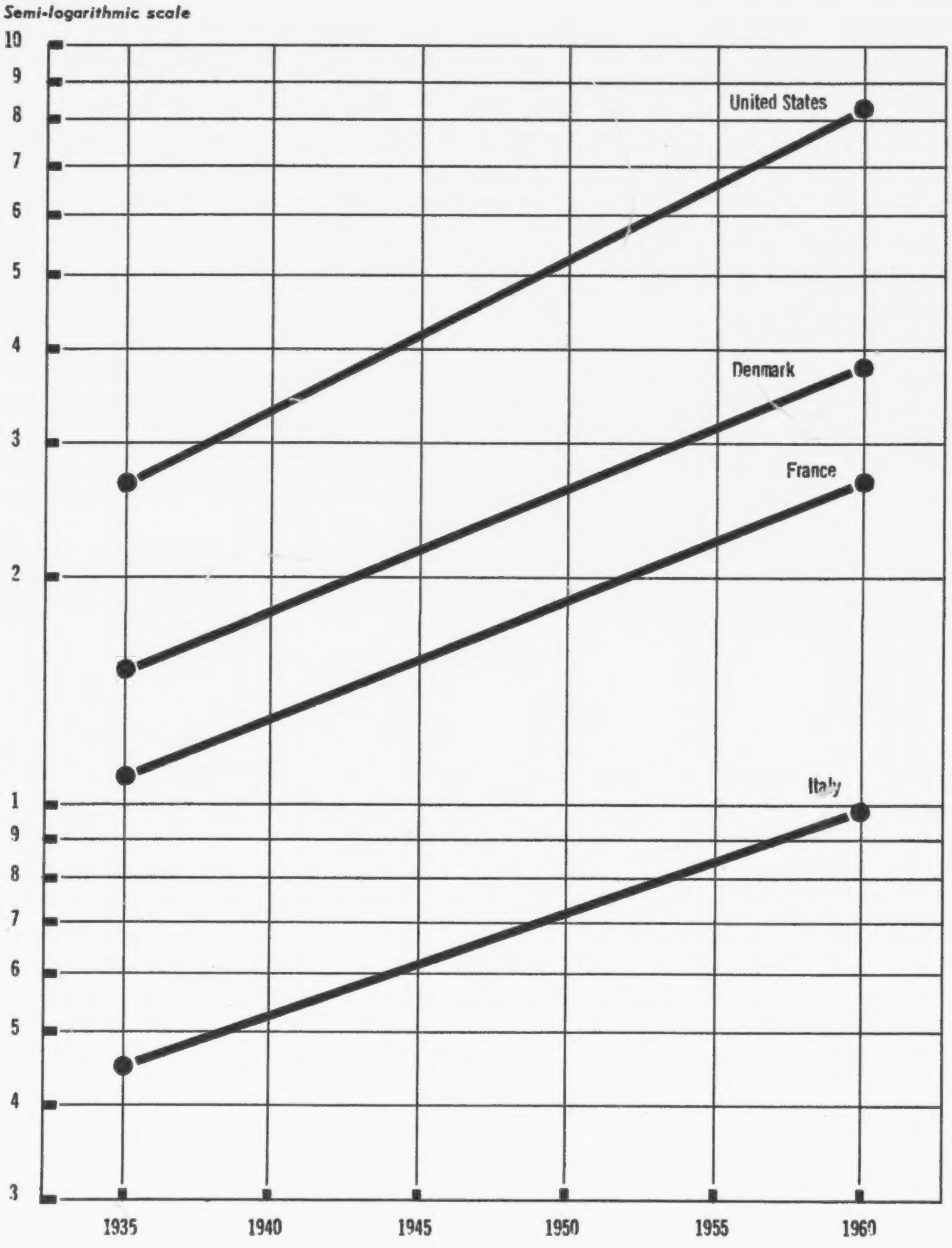
Some of the consequences of these movements may be discussed at this point in general terms. One can compare the level of productivity at one phase of development and the other, and make comparisons between countries over time. One can also consider the aggregate socio-economic effect of this kind of changes.

Some short-term data on output per man and its relation to the degree of capital intensity are shown above in Chart N° 2. Longer-term data, for output per man only, are shown in Chart ° 3, for a few selected countries only.

The trends shown are very nearly parallel. They demonstrate how countries are gradually passing through the same levels, in a succession which is at least in part determined by their "starting levels". Output per man in Denmark and France is now where it was in the United States in the early forties and in the early thirties, respectively. Output per man in Italy is now close to where it was in France in the midthirties. Extrapolation of the Danish trend would

Chart 3

OUTPUT PER MAN WORKING IN AGRICULTURE, INTERNATIONAL WHEAT UNITS PER MAN, LINEAR TREND 1935-60, SELECTED COUNTRIES



place it near the present United States level around 1980, as is also indicated, on different grounds, in the country note for Denmark. There is thus no basis for any statement to the effect that European agriculture is subject to any peculiar limitations that would not allow it to follow similar productivity trends as American agriculture.

The other question regards the rationale for the current process of substituting capital for labour. Time and again the question is raised : what is the net gain to society in releasing labour from agriculture and increasing, at the same time, the amount of labour spent on producing farm production requisites needed to replace the labour released from agriculture ? Some not too profound reflection on the cost-price relationships under which the substitution takes place should have answered the question in principle : there must be a sizeable net gain to society, otherwise the factor prices would not obtain under which the substitution can take place. Especially when the income level of farm labour is considerably lower than that of urban labour, it is inevitable that the quantity of non-agricultural labour incorporated in farm production requisites must be smaller than the quantity of farm labour which it substitutes. The only remaining question might be that of the magnitude of the socio-economic gain made in this manner. If the magnitude were slight (which could conceivably be a consequence of farm support policy, or some incidental circumstance), then it might be argued that non-economic motives (such as attachment to the rural tradition of the country) could have their sway.

To answer this question about magnitude, at least two inquiries are available to date, from the United States and Denmark. Both are commented upon in the country notes for these countries. (1) The study from the United States shows that the net gain to the community is very large indeed, in fact somewhat larger than could be concluded from conventional net-productivity analyses. The study from Denmark is less emphatic in drawing a similar conclusion, but is also open to considerable objections, most of which, if incorporated in the analysis would tend to make the socio-economic gain larger than shown by the study in question.

Until other studies show the contrary, the presumption is therefore that the substitution process is highly desirable from the viewpoint of the development of a national economy, provided the labour released from agriculture finds gainful employment elsewhere. Any attempt at maintaining the present number of farmers (or any number considerably in excess of that resulting from current trends in the future) will therefore have to carry a high price in economic terms.

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(1) F. Dovring, "Labour used for agricultural production", University of Illinois, Department of Agricultural Economics, A.E.R.R. 62, April 1963 ; H.Gad, "Landbrugsbefolkningens tilpasning til erhvervets aendrede vilkar" in "Tidsskrift for landøkonomi", 1963 : 3, pp. 123 sqq.

3. Summary of national projections

Detailed economic projections including forecasts of the agricultural labour force that can be sustained at unchanged parity of income, are available from Germany and Italy. More summary projections have been made for several other countries, including the United States, Denmark, Spain and Turkey.

The German study, by Plate and Woermann and further developed in the "Professoren-Gutachten" is essentially in line with the analysis proposed above in this chapter, "Party-induced" exodus from agriculture up to 1970, is estimated at 23 per cent if present price relationships (under the German system of price protection) are continued, and at 33 per cent if the lower price level is established that will be a consequence of the E.E.C. common tariff system for agricultural products. Even so, it may be said that the German study is somewhat optimistic as to the level of output that can be achieved in German agriculture in the future, especially under the alternative of prices under the E.E.C. common tariff.

The Italian projections, published by Saraceno and available in two versions with a slightly different time horizon, is based on a moderately optimistic forecast on future exports of specialities. It arrives at an estimated rate of exodus from agriculture which would lead to a reduction by one-fourth of the agricultural labour force from 1961 to 1971. No attempt was made at underplaying the rate of exodus ; rather, one of the aims of the inquiry was to establish the amount of labour that could be made available to other industries. No substantial improvement in the parity ratio of incomes is envisaged over this period.

The I.B.R.D. report for Spain has a similar calculation in summary form. An overall growth rate of 6 per cent per year is assumed for the whole economy, but at the relatively high level of agricultural population, this leads only to a moderate rate of agricultural exodus ; the labour force in agriculture is thought of as reduced from 4.8 to 4 million in the decade 1960-70. This comes close to the rate of exodus forecast in a somewhat earlier development perspective in which the question of exodus was keyed to the efficiency of farm labour rather than to their income level. A recently approved development plan for Spain also calls for a rate of 6 per cent annual growth of the GNP an annual decrease of the agricultural labour force of 1,5 % for the years 1964-67.

The development perspective for Turkey is even bolder and envisages an over-all growth of the GNP by 7 per cent per year. The rate of growth foreseen for the agricultural sector is so much slower (4.2 per cent per year) that the growth rate in the hitherto limited industrial sector is assumed to be correspondingly higher. With rapid population increase continuing, the agricultural population would still increase somewhat over the next 15 years, although at a much slower rate than previously ; and with a sharply declining percentage depending on agriculture, an absolute decline in later phases would be made possible.

In the United States and Denmark, projections of farm labour force reflects more some calculations about future farm labour productivity, even though the income perspective is also kept in mind. In the United States, the farm labour force in 1970 is projected to be 1/4 smaller than it was in 1960. In Denmark projections have been proposed under alternative assumptions about exports, implying that the labour force in 1970 might be 22 - 31 per cent smaller than in 1960, and a corresponding reduction up to 1980.

For other countries, rough estimates, not based on national studies, are shown in the country notes, and made according to the theoretical framework discussed above.

Chapter 3

THE NEED FOR LABOUR IN AGRICULTURE

1. Introductory

The amount of labour required for agricultural production can most readily be estimated by aid of norm figures based on work studies. By "standard hours" or some similar unit of work capacity, the requirement for direct human labour for agricultural production from stated acreages under specified land use and stated numbers of livestock can be estimated. Such measurements refer to the quantity of direct human labour that would be needed (and sufficient) if the industry were rationally organised and if there were no structural obstacles to attaining this level of efficiency.

This chapter is concerned with this kind of "ideal" measurement. The amount of labour surplus revealed by such analyses may only in part be removed in the near future because part of it may be tied to the land by structural features such as the seasonal distribution of the work load, the size and layout of farm holdings, and so on. The extent and character of such structural obstacles to the removal of excess labour are treated in the following chapter.

Moreover, the degree of underemployment that can be calculated in this way refers to underemployment as a technical fact. Underemployed are then those who either do not have enough work to do even with the technological level prevalent in their country at the time, or who fail to live up to that level of technical efficiency because of lacking economic incentive to do so, or because of structural obstacles. In contrast to this concept of technical underemployment stands the somewhat less precise notion of economic underemployment which includes all those situations where workers are tied up in work which is decidedly less remunerative than their alternative on the labour market. The technically underemployed are usually also economically underemployed (but not always or to the same extent), but the economically underemployed are not necessarily technically underemployed, since the technical concept takes into account the technical level that is normally available in the country or area, even though it be economically unsatisfactory at the time.

The measure of employment by this method corresponds to "full employment" if the size of the job, so measured, amounts to the same number of man-years as the number of man-year equivalent labour force available for farm work form among the work force permanently and/or intermittently committed to agricultural production. Details of the materials used for such measurements and their treatment are given in Appendix 2.

A measure based on labour requirements is a measure of the size of the job under prevalent conditions, not an expression of the earning power of the industry. The same number of hours, under the same efficiency norm may correspond to a higher or lower level of gross output and of net income, as the unit yields vary geographically and over time.

2. Levels of technical efficiency

Data on requirements for agricultural labour are available from many sources. (1) Most data series of this kind are published in incidental publications rather than in organised statistical series. In most countries it is only recently that work studies in agriculture have been conducted systematically and in such a manner as to permit establishing time series to illustrate successive changes in technological efficiency. Systematic time series are available from the United States for most field crops and most livestock enterprises while norms referring to horticultural specialties (vegetables and permanent crops) have been published only with reference to certain benchmark years, mainly in the recent past. Alternative norms, to match the situation on a given farm rather than to allow overall calculations for the country are available from Germany (2) and some other countries. Comprehensive data series from the United Kingdom and some other countries in Europe remain technically unpublished and are often difficult to locate.

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(1) For sources on European countries up to around 1950, see F. Dovring : "Land and Labour in Europe 1900-1950", The Hague 1956, 2 ed. 1960, Appendix 4, pp. 398 sqq.

(2) G. Kreher : "Leistungszahlen für Arbeitsvoranschläge" and "Der Arbeitsvoranschlag im Bauernhof", 2 unveränd. Auflage Stuttgart 1955. (Schriftenreihe des Institutes für landwirtschaftliche Arbeitswissenschaft und Landtechnik der Max-Planck-Gesellschaft. H.17).

From the variety of sources available, a small selection of data is shown in Table 4, merely to illustrate the variation which exists from one level of efficiency to another, and without attempting anything remotely resembling complete coverage.

The diverse origin of the data makes them far from comparable in any strict sense, and the conceptual differences must of course be carefully noted for any analytical use of the data.

The norms shown as "Mediterranean areas with traditional farming" are quoted from a Greek source. They are in broad agreement with such known from various parts of Italy, Spain, Portugal and Yugoslavia, even though these Mediterranean work norms display considerable variation due to climate and methods of cultivation used locally ; for instance, the amount of hand weeding needed - and applied - could sometimes raise the norm for wheat to nearly twice the amount shown, etc. In other cases, somewhat lower norm figures are reported from one or another area in Mediterranean countries, without contrasting against the general level indicated by the norms shown. In Italy, recently, labour efficiency has risen substantially in several sectors, and the same would presumably be the case in parts of Yugoslavia.

The norms shown from the Netherlands, Denmark and England show various stages in the successive increase in efficiency coming from post-war mechanisation. At the time of traditional horse farming, these countries were not much more efficient than the Mediterranean ones, with reference to crop areas and livestock numbers that is, but had a considerable edge in total resource productivity because of higher unit yields. This factor still makes some of these norms less remote from the United States work standards than would appear from the figures of the table. The three countries shown are also not all on the same stage in relation to each other.

The table also illustrates the fact that United States farmers already in 1910-14 were on the whole more efficient - at least in several enterprises which are important in the United States - than West European farmers were until recently. The contrast is most salient as regards field crops, especially grains ; it is less striking with regard to root crops and even less in specialty crops such as tobacco. The data on tree crops from 1954 allow to surmise that here, too, the difference in efficiency level remained more moderate for a long time. The differences in animal husbandry are also smaller than in the case of most crops. The comparison cannot always be pursued in detail because several livestock norms in the United States are given with reference to production (cwt of beef produced, etc.) rather than as per head of animals.

What the net result is of these various and varying differences, between the United States and several countries in Europe as well as in comparisons among the latter, depends in no small measure on the composition of the "basket" of farm enterprises in the country.

Table 4

Labour norms, selected countries and selected enterprises.
Hours per hectare or per head of livestock

(a) Field crops

Enterprise	Mediterranean areas with traditional farming (1)	Yugoslavia 1960	Italy 1960	Netherlands 1960	Denmark 1960	England (2, 3) small farms	United States (3) 1910-14	United States (3) 1955-58
Wheat	260	91	60	130	34	70	38	10
Maize	500	432	..	..	..	..	88	26
Rice.	1130	..	120	..	..	..	138	33
Potatoes	1320	..	..	500	223	400	190	132
Sugar beets	..	850	..	400	239	340	..	133
Tobacco	3280	..	..	(2000)	..	..	890	945
Cotton	1180	..	..	..	..	..	208	168
Rotation hay	300	..	..	100-160	49	40	30	15

(b) Permanent crops

Enterprise	Mediterranean areas with traditional farming (1)	Italy 1960	United States 1954
Winegrapes	750	..	265
Olives	430	..	393
Citrus fruits	1600	..	250
Apples.	1320	1320	305
Figs.	1210	..	280
Almonds	380	..	178

(c) Livestock

Enterprise	Mediterranean areas with traditional farming (1)	Italy 1960	Nether-lands 1960	Denmark 1960	England small farms (2)	United States 1910-14	United States 1955-58
Milk cows	300	250	165	207	120	146	116
Other cattle	144	..	40-80	9-71	24-56	..	..
Sheep	43	..	7	..	4-8	..	..
Poultry (layers)	12	..	1.75	..	2	.33	.24
Poultry (broilers).	..	..	.052	..	.08	..	.016

(1) Data in days multiplied by 10.
(2) Data in days multiplied by 8.
(3) Data referring to acres multiplied by 2 1/2.

Sources :

Mediterranean areas with traditional farming : Chr. Evelpides, "E georgia tes Ellados", Athens 1944, p. 30.

Italy : "Annuario dell'agricoltura italiana", 1962 (advance data received from the Istituto Nazionale di Economia Agraria).

Netherlands : Data received from the Landbouw-economisch instituut.

Denmark : "Undersøgelser over landbrugets driftsforhold. Periodiske beretninger". 16. Arbejdsforbrug ved forskellige landbrugsarbejder. Copenhagen 1962.

England : Restricted data supplied to the O.E.E.C. in May 1959 (rather close to those shown in the Farm Management Handbook and other publications ; see Dovring, loc. cit. under the United Kingdom).

United States : R.W. Hecht and G.T. Barton, "Gains in productivity of farm labour," U.S.D.A. Technical Bulletin 1020, Dec. 1950 ; R.W. Hecht and K.R. Vice, "Labour used for field crops, U.S.D.A. Statistical Bulletin 144, June 1954 ; R.W. Hecht, "Labour used for livestock", U.S.D.A. Statistical Bulletin 161, June 1958 ; F.E. Gavett, "Labour used for fruits and tree nuts", U.S.D.A. Statistical Bulletin 232, June 1958 ; "Changes in Farm Production and Efficiency", U.S.D.A. Statistical Bulletin 233, rev. Sept. 1959.

Yugoslavia : Institute for Agricultural Economies (Belgrade) norms referring to the socialised sector.

In terms of productivity rather than work efficiency in the technical sense, the net result depends of course also on the level of physical yield per area unit and livestock unit, as well as on the output of animal products per unit of feed.

3. Aggregate measurement and the farm size check

In a previous study estimates were made of effective employment in agriculture in several countries in Europe, both in the aggregate and by size of farm. (1) Labour norms were used which were assumed to be roughly adequate under the conditions of the country at the time. The adequacy of the efficiency level was tested, where possible on the criterion that it should fit the farm-size situation. Subsidiarily, and in order to provide a common measure against which to gauge inter-country differences, the aggregates were also estimated in terms of American labour norms from 1945-48. The percentage effective employment of available agricultural labour force in the country was of course lower when measured in American norms. The relation between the two measurements differed from one country to another. The measurement in American norms was admittedly theoretical, since no evidence had been produced (or sought) to the effect that American work norms were applicable in these European countries, or as to the degree to which they might be applicable in those countries.

Before commenting on this type of calculation, it may need to be stressed that the various levels of technical efficiency may all, in their time and place, be equally rational (or irrational) from an economic viewpoint. Economic rationality depends on relative factor prices (in relation to a given productive situation), as well as on availability of capital, and not only on physical rates of substitution. The sequence of successive stages where substitution of capital for labour becomes increasingly feasible constitute a chain of dynamic changes where no country is as yet even approaching an ultimate equilibrium.

Several countries in Western Europe were (around 1950) above or around half as efficient as indicated by the American standard. This is not altogether surprising. The basket of enterprises in west European agriculture was (and still is) different from that in the United States ; as a more or less conscious reaction to overseas competition, it had become oriented above all towards such enterprises in which the difference in efficiency was least salient, that is those enterprises where European farming stood most of its chances to remain competitive. Above all, the relative position of animal husbandry is (or, at least, was) stronger in west European agriculture ; and within animal husbandry, dairy farming had a relatively very strong position in several of these countries.

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(1) F. Dovring : "Land and Labour in Europe", pp. 84 sqq., 115 sqq.

In net productivity, the difference was of course even smaller because of the generally higher yields per area unit and per animal unit in western Europe. On the other hand, the discrepancy between the level of effective employment and the size of the labour force was wider (i.e. the degree of under-employment was higher) in several countries in Europe than in the United States (in part this goes back to differences in construction of labour norms). This draws in the opposite direction from the difference in yield level. It was also the main reason why large numbers of European smallholders lagged behind the efficiency standards normally available in their countries.

Southern Europe showed up with about 1/4 to 1/5 of the American efficiency standard, apart from a sizeable amount of under-employment by their own standards. The difference was as large as it was not only because of the much higher work norms returned from southern Europe but also because of the marked seasonal unemployment in large parts of the Mediterranean area - a condition linked to the weak position of animal husbandry in most parts of these countries. In view of all this it is rather remarkable that the difference against American and west European standards is not even larger, as one would expect when seeing the enormous differences in the work norms for individual field crops. The answer is again that Mediterranean agriculture has more emphasis on several lines of production where the difference between American and national standards is more moderate than is the case with ordinary field crops.

To this it should be noted that the American standard that was used for this comparison, that is the standard of 1945-48, was already about 30 per cent more efficient than the standards which had prevailed in the United States two or three decades earlier. This means, among other things, that the technical efficiency of farm labour in England around 1950 was not far removed from that of the United States farming between 1910 and 1930 ; and the technical efficiency standards that obtained in Scandinavia and the Benelux countries a decade ago were not very far behind that level either. This is to be understood with the reserves pointed to already, as regards crop yields and levels of technical underemployment. All told, the productivity of labour and other factors of production in west European agriculture around 1950 was not very far below what the United States had before the great upsurge of productivity in the last two decades.

These remarks, obviously too, refer to a comparable basket of enterprises or products. When it comes to southern Europen with its clearly much lower levels of efficiency, this qualitative difference makes it even more difficult to locate a benchmark for comparison of what their present level may resemble in the past of some other country.

Since around 1950, the technical efficiency of farming has made great advances both in North America and in Europe. The trend towards reduction of manpower and continued increase in output are two persuasive witnesses to this, but they alone do not tell the entire story. The degree to which there is still a surplus of labour, in relation to the new level of efficiency, can best be tested against data on the level of farm sizes.

Several countries in Europe have tabulations in their agricultural census reports where crop areas, livestock numbers and manpower are shown by size of farm. In the United States this type of table is incomplete for the country as a whole, but rather complete on the State level. Results from size-of-farm calculations are shown in certain of the country notes below. These imply a test on the realism of the calculation of the total size of job because they must show approximately the same number of man-years required and available on the larger farms - those where hired labour plays a sizeable role. From material shown in the country notes, Table 5 renders some of the totals which may serve to illustrate the pace of progress in agriculture.

Table 5

Manpower requirements in agriculture, selected countries.
(Data in thousands of man-years, 000's omitted)

Country	Period	Manpower needed at :		Rate of decrease in manpower requirement, compound rate (per cent)
		beginning of period	end of period	
Denmark . . .	1951-59	349	235	5.0
France	1942-55	3,720	2,467	3.1
Germany . . .	1949-60	2,030	1,475	3.0
Netherlands . .	1950-60	414	301	3.1
U.K. (England)	1948-60	820	629	2.2
U.S. (aggregate) .	1950-60	6,040	4,124	3.9

The data are of course far from being strictly comparable between countries, and the fact that the period shown is rather short and not always the same makes it not very useful to compare the national rates of reduction in manpower requirements. But this is not necessary either. The message of the table is that rates of technological advancement of 2 to 3 per cent per year have been characteristic of the industrialised countries in the post-war period, and also that even higher rates are by no means ruled out. As pointed out in some of the country chapters, the counterpart of this is in the fact that the degree of underemployment, as a rule, has not gone down ; in some cases it has even gone up, among other things because of the tendency among farm operators to remain on their family-sized holdings even when wage workers and unpaid family workers leave.

In very general terms, then, technical efficiency has advanced at a rate to match the rate of agricultural exodus. The result is not altogether surprising. The larger farms, those who rely on wage labour, have seen their labour force dwindle at a rate which as a rule has been at least equal to the rate of reduction in the agricultural labour force in general. They have naturally reacted by adopting so much of the new labour saving techniques as was necessary to maintain production. The smaller farms have lost nearly all their hired labour force, but even as pure family farms they have not always been able to keep pace with the rising efficiency of the larger farms. The moderate rate of exodus from the smaller farms has only in part offset this, and the result is persistence of labour surplus, largely tied to the land by reason of the farm structure, as before.

4. Analysis and outlook

A common feature in the recent advances in efficiency in agriculture in Europe and North America has been in the fact that work requirements have gone down most in field crop production and less with regard to tree crops and most lines of animal husbandry.

The very marked advances in the efficiency of field crop production in Europe are in keeping with the high degree of mechanisation achieved in several of these countries within a short span of time. (1) Among the most readily mechanised crops are the grains. Some data on combine harvesters, related to the acreage in grain crops, may serve to illustrate this (Table 6).

These advances in field crops, and especially in grains, are of course quite logical. These are some of the areas in which highly mechanised techniques are available. But this is not the whole story. These techniques are available in these work areas because they have been particularly needed there. Grain crops are among those that contribute most to seasonal peaks in the work load and are also among those for which hired labour plays a major role. Grains are in general most important on large farms, that is those where the shortage of labour was most acutely felt after the war.

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(1) On farm mechanisation in general, see "Development of Farm Motorisation and Consumption of Motor Fuels in Member Countries", Paris, O.E.C.D., June 1963 (mimeogr.).

Table 6

Grain combines : hectares of grain area per combine harvester, and combines per 10,000 hectares of grain area, in 1951 and 1960

Country	Hectares of grain area per combine harvester		Combines per 10,000 hectares of grain area	
	1951	1960	1951	1960
United States	96	73	104	162
Canada	206	130	49	77
United Kingdom	172	63	58	158
Ireland	360	111	28	90
Denmark	2,365	133	4	75
Norway	..	40	..	250
Sweden	125	57	80	175
Finland	2,170	226	5	44
Netherlands	409	127	220	60
Belgium	..	187	..	53
Luxembourg	..	77	..	130
France	1,357	208	7	48
Germany	..	77	..	130
Switzerland	..	268	..	37
Austria	2,900	117	3	85
Italy	..	1,505	..	7
Yugoslavia	8,732	1,040	1	10
Greece	3,100	914	3	11
Turkey	..	2,240	..	4
Spain	..	1,574	..	6
Portugal	..	5,250	..	2

Sources : F.A.O. Production Yearbook, and national statistics.

The reductions in labour requirements which were or are possible in the grain crops are often very large. It was shown above how the labour requirement for wheat varies between 260 hours (or more) under primitive conditions, all the way down to 10 hours in the United States in the late fifties ; on the Great Plains in recent years, the labour requirement for wheat has gone down to 7 1/2 hours per hectare (3 hours per acre). Beyond that, not so much more should be to gain. That similar reductions are possible also in Europe has been shown by some recent inquiries in Germany and England. The German inquiry dealt specifically with the labour required for harvesting small grains. (1) With hand tools, the requirement was 100 hours per hectare, dropping to 60 when grain binders and stationary threshing machines were used, and further to figures between 10 and 20 hours, when combine harvesters were accompanied by one or another technique for collecting the straw, while procedures which sacrifice the straw require only 3-5 man-hours per hectare for the harvest, which comes close to the American labour standard for small grains. It is interesting to note, also, that these high levels of use of machines such as combine harvesters are possible on the farms of continental Europe largely through widespread use of machines owned by co-operatives or by machine-hire firms,(2) or by groups of neighbours.

The English inquiry deals specifically with projection of labour requirements for cash crops in 1970.(3) The following comparative information, and projections, are given (hours per acre) :

	1930	1950	1960	1970
Potatoes . . .	215	195	140	60
Sugar beets .	235	180	120	20
Wheat	53	33	17 1/2	6 1/2
Barley	54	23	12 1/2	6

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(1) W.C. Brenner : "Überblick über die landtechnische Entwicklung in West-Deutschland seit 1940", in "Berichte über Landwirtschaft", 1958, pp. 853-864 (data quoted here on p. 859).

(2) K. Westerich : "Die verbundene Maschinenhaltung in der Landwirtschaft verschiedener Länder Westeuropas", in "Berichte über Landwirtschaft", 1957 : 901-934.

(3) J.S. Nix : "Labour for cash crops 1930-1970", in "Agriculture" (London) 1961 : 119-125.

These projections are based not only on past trend but more on work studies. They also promise further reduction of the seasonal peaks in cash crop production.

Gains in efficiency in grain cropping have been of large importance in North America with its vast acreages in grain crops. In most countries in Western Europe, grain crops are a minor feature in the cropping pattern ; the total labour requirement for such crops was in general 10-15 per cent of the whole farm work load around 1950, and is now likely to take no more than 5 per cent of the farm job in some of those countries. Cashing in on what remains to be done by way of mechanisation of grain production can therefore contribute only minor gains in total efficiency in these countries. Also in the recent past, mechanisation of other field crops (mechanical harvesting of root crops, etc.) must have contributed relatively much to the reduction of total labour requirements in western Europe.

In southern Europe, where small grains and maize are more sizeable crops, relatively speaking, than in western Europe, wider diffusion of mechanical grain cultivating and harvesting methods will contribute more than they did in western Europe. Most of these gains remain to be made in the Mediterranean countries.

While there is no doubt that sizeable gains in efficiency can still be made in several field crop enterprises also in North America (corn combining, as yet only partly applied, cotton picking and stripping likewise, pick-up hay-baling, etc.), and even more so in western and southern Europe, it is of some interest to notice that one of the results of recent advances in the efficiency of crop farming is that the share of crop farming in total labour requirements has declined in several countries. Details of these proportions can be learned from the detailsunderlying the calculations of total labour requirements by countries. For the United States, this detail is published in some of the references quoted above.

Animal husbandry now holds the position of using by far the largest part of all farm work in western Europe and nearly half in the United States. The relatively mechanisation-resistant category of tree crops plays a sizeable but minor role in the United States and France but a very major one in the Mediterranean countries where animal husbandry has only the third place.

In southern Europe with its large unmechanised field crop areas, reduction of labour requirements by a third in a decade should be possible mainly (if not exclusively) on that account. This may have its problems on hilly land, and the impact may be somewhat weakened because the general orientation of production tends to give less importance to extensive field crops.

In western Europe it is evident enough that a large part of those gains in labour efficiency which will make possible the targets discussed in this report will have to come from reductions in the labour requirements for animal husbandry. In the United States the same does not hold to quite the same extent but will do so more and more in the future.

It is also in the United States that most of the efforts have been made up to now to find systematic means of reducing labour requirements in animal husbandry and in horticultural specialties. Feed lot techniques and mechanical feeding of young cattle by mechanisms resembling an assembly line are quite famous but as yet not quite so generally applied. Feeding of very large numbers of animals in giant establishments, by techniques resembling those in the now very high-mechanised poultry industry, is coming up here and there but is as yet not characteristic of the beef industry or the hog industry, taken at large. As an extreme instance we may discuss what advances are made or foreseen with regard to milk cows.

Under primitive conditions, a herd of 12 milk cows was supposed to employ a full-time worker. In western Europe around 1950, herds of 15-16 milk cows per worker were regarded as satisfactory, while American standards of the late forties indicated about 21 cows as typical of a full-sized one-man herd. Milking machines as such did not contribute as much to efficiency as management systems and layout of buildings. Recent research indicates that well-run American establishments allot about 31 cows to a worker, while the most advanced techniques foresee as many as 60-65 cows per worker as feasible under top-level management. (1) That these indications are taken seriously elsewhere was seen in a recent French inquiry which took the 60-cow herd as standard. (2) A Dutch study (quoted in the Netherlands country note) projected a specialised dairy farm using less than half as much work per hectare and per animal as would be needed according to 1960 standards in the country ; this is still far from the most advanced American standard, but the time horizon attached (1970) requires a more immediately feasible goal. The sixty-cow standard actually comes close to what is achieved on dairy farms in New Zealand, where an exceptionnally favourable climate allows year-round outdoor grazing.

These indications do not add up to any comprehensive forecast of any maximum or minimum estimate of labour requirements for 1970. They are however enough to show that, in a general way, reductions in overall labour requirements of the magnitude of one-third should be technically feasible in all the O.E.C.D. countries over a decade to come. This may be said already with reference to the crop areas of 1960. A fortiori it is even more likely if the current tendencies towards surplus production force several countries to reduce the areas of some of the more labour intensive land uses, thus reducing the overall weighted average, and the aggregate total, of labour requirements in crop farming.

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(1) R. Van Arsdall and V.W. Davis, in "Agricultural Engineering," September 1960.

(2) R. Martinet : "L'influence de la taille des entreprises de production laitière sur leur rentabilité". Bulletin technique du Génie Rural N° 54, November 1961 (mimeo).

Just where and how these reductions in labour requirements may become feasible, should be looked into further. Whether they are also likely to come is a matter to be discussed in the next chapter.

Chapter 4

OBSTACLES AND OBJECTIONS TO REMOVING THE SURPLUS OF LABOUR

The preceding chapters have aimed at analysing the composition and recent changes of the agricultural labour force and at showing the amount of manpower that could receive an adequate income, and would be needed, in agriculture, both at present and in the medium-term future. In a step by step analysis, it was disregarded, for the moment, whether the labour surplus could, practically speaking, be removed, or whether this could happen as fast as the development of the economy would indicate. We did not, however, expect full income parity to come about over the medium-term period under study, but rather a maintaining of the present income-parity ratios was assumed. The listing of obstacles, in this chapter, will account for the reasons for this moderation in the formulation of plan targets or development objectives. It will also attempt to show whether the objectives, thus formulated, are achievable or too ambitious.

At the present stage a discussion of the obstacles to removing the labour surplus form agriculture will consist mainly of a list of qualitative points to consider, as a basis for a programme of inquiry geared specifically towards this set of problems.

First of all it is fairly obvious that, as agriculture becomes more and more mechanised and rationalised there is, of necessity, a certain time lag in the application of each type of improved technology. It is not just a question of a "modern" technology replacing a "traditional" one ; in most cases, there is a sequence of more and more modern stages of technology succeeding each other, as the supply of capital and the price relationships render this feasible. It is thus natural that innovations do not spread as rapidly as theoretical input-output relationships would seem to call for.

Several classes of pre-existing facts contribute to slowing down the process of adjustment. The following could be readily quantified, given adequate information :

(a) The seasonal distribution of farm work ;

(b) The age distribution of the agricultural population ;

(c) The size and tenure structure and the geometric layout of farm holdings ;

(d) Existence of investments, not yet depreciated, belonging to the equipment of the previous stage of technology ;

(e) Financing problems.

In addition, there are factors which lend themselves to quantitative measurement only with great difficulty or not at all. Inertia, traditionalism, and unwillingness to incur risks are mainly qualitative features and can best be quantified by measuring the size of populations among which they are important. The educational level, lack of training facilities and of centres for occupational guidance also hamper mobility in many areas. Lack of training for jobs other than agriculture is more than just a shortcoming in the new job ; in the case of skilled agriculturists, it also means the presence of a skill which would have to be given up when shifting to another type of job (which is analogous to the scrapping of a serviceable farm building). Location close to, or remote from, existing or prospective industrial plants is a factor which may be quantified in a sense, even though not as clearly as the first mentioned factors. The economic and social structure of agriculture often includes elements affecting the degree of mobility.

There are also qualitative factors such as goals and values, and their expression as propaganda and public opinion. (1) Family farm ideals, agricultural fundamentalism, and various other socio-philosophical standpoints and instincts may influence the decision to stay or to move. They may also, in some instances, become crystallised into organised political action with the aim of arresting or retarding exodus from agriculture. Quantification of such phenomena may sometimes be needed to grasp the kind of obstacles which a rational economic development is up against.

Of a somewhat different character is the objection against agricultural exodus which regards the negative effects upon a neighbourhood of a decline in total population. The regional-planning argument is distinct from both the structural obstacles within the farming industry and the ideological positions surrounding it, and thus deserves to be considered on its own merits.

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(1) cf. Karin Dovring : "Land Reform as a Propaganda Theme", in Dovring, "Land and Labour in Europe", The Hague 1956, 2 ed. 1960, chapter 7.

1. Seasonal distribution of work load in agriculture

This point has been much written about and is of course most important in monocultural (single-enterprise) situations where certain crops with narrowly defined planting and harvesting seasons claim a large part of all the labour input. It has been shown to be very important in Italy, (1) and is even more so in some other Mediterranean areas. This is in marked contrast to western Europe where in many cases the labour intensive parts of animal husbandry dominate the farm labour situation in such a degree that not much remains of seasonal peaks. (2) In north-western Europe, recent advances in the efficiency of crop farming must have accentuated this tendency further and smoothed out the seasonal variations in labour load even more.

This type of solution to the problem of seasonal variation in the work load is valid both in mixed farming and wherever the more labour intensive parts of animal husbandry are important (especially in dairy areas). Mediterranean agriculture, where the seasonal problem is most serious, can of course make some adjustments to diminish its importance. In cases where a certain labour force is tied to the land and has few if any non-agricultural outlets for its work time, extensification is a poor solution to the problem of low farm income. (3)

There are however many situations of technically very advanced crop farming where regional advantages favour a far gone specialisation on one crop or a narrow choice of crops with much the same seasonal distribution of their labour requirements. The American wheat belt is perhaps the most striking case, but also in the central part of the Corn Belt there are many cash grain farmers who would be seasonally unemployed if farming were their only occupation. Apart from any genuine prospect of diversifying their farming, the solution is here in part-time employment outside agriculture. Many "seasonal" farmers do not even reside in the immediate vicinity of their farm land ("suit-case farmers"). Similar solutions may become important also elsewhere. Both in the United States and in several countries in Europe there is widespread dual employment ; in some areas, e.g. the industrial districts of Germany, it is rather on the decline while in others, for instance Denmark, it is increasing at present.

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(1) G.G. dell'Angelo : "Note sulla sottoccupazione nelle aziende contadine", Rome, SVIMEZ, 1960, pp. 32 sqq.

(2) Nils Westermarck : "Structure of family farms and their line of production", in "Acta agriculturae Scandinavica", 7 : 2/3, Stockholm 1957, pp. 275-297, referring to record-keeping farms in southern and central Finland.

(3) Det landøkonomiske Driftsbureau (Copenhagen),"Undersøgelser over landbrugets driftsforhold". Periodiske beretninger. 17. Bedriftsmodeller Copenhagen 1962.

2. Age distribution

The subject has been discussed at length in some of the country notes. Among other things it was found that in cases where exodus from agriculture is really rapid, it has included sizeable numbers of people also in their middle-aged years, not only young adults. It needs to be explored further just where the age limits lie that would preclude or render difficult a transition to other employment, especially of farm operators or their prospective heirs. In the past, when most of those who left agriculture were either wage workers or unpaid family workers or holders of very small farms, the question of age limits may have been less imperative than it will be in the future, when most of the surplus will consist of farm operators and their families. The proportions of this problem are of course different if there still is a substantial number of wage workers (France, Italy) or where it is known that a large part of the unpaid family workers are inclined to leave under present circumstances (Italy) ; an inquiry referred to in the chapter on the Netherlands reveals a considerably lesser propensity among Dutch farm heirs to leave agriculture.

3. Size, tenure structure, and layout of farms

The effect which the size structure of farms may have on mobility (or, rather, on the lack of mobility) of the farm population, is closely linked to the age limits above which farm operators are unlikely to leave farming. As technology advances, it is inevitable that some farms which were regarded as fullsized family farms when their operators began farming, become under-sized, and their operators underemployed unless they succeed in enlarging their farms - which, for obvious reasons, cannot succeed for all under-sized farms. The degree to which under-sized farms are likely to exist in the future can to some extent be gauged from information about present and past size distribution. In one of the country chapters (Denmark) projections have been made to show what size structure would come about at certain stated later phases, provided the formation and enlargement of farms was left to market forces. (In case of an incisive structural policy, the outcome could be projected only on the basis of the content of that policy). The results of these projections indicate that the future structure would be largely analogous to the present structure, not only as regards the size distribution of holdings (which was the starting assumption, not a result of these projections) but also as regards the distribution of family and hired workers, and in the relative size and structural location of a labour surplus.

In most of the larger countries, such projections can only be made on the basis of a breakdown on regions with a somewhat homogeneous farm structure within each region. In countries where the income level is rising fast and, as a consequence, the distribution of wealth within the country may become modified (as in Italy), a projection also needs to take into account the effect this has on a possible modification of the distributional function of farms around the average size.

The tenure pattern is of interest in a somewhat different manner. When land is rented on short-term contracts, there is less of an obstacle to rapid enlargement of existing farms than in the case of entirely owner-operated land. Tenant farmers can be terminated, unless protected by law.

Several countries in Europe have legislation protecting tenant farmers from termination of their contracts and guaranteeing their ownership of such improvements as they have brought about on the farms they run. Under such conditions, tenant farmers may not be much more inclined to move than are owner farmers. There are reports, however, from Italy to the effect that, as wages go up in city occupations, some tenant farmers of the share-cropping categories ("mezzadri") leave voluntarily even though their contracts are protected by law ; the value of the protected contract can become questionable when the general income rises much higher than was the case when the contract was first written.

In a different sense it is interesting to note that, in the United States, the largest and most efficient farms are often part-owned, part-rented. This points to the question of financing land acquisitions as one of the crucial problems of farm enlargement. Conventional leasehold of part of the holding should then be an advantage, because it allows more flexibility and in many cases is the only way to make the farm larger. In France, where part-renting is widespread, it has been suggested recently (by G. Bergmann) that special financing arrangements ought to be introduced to facilitate for those who mean to stay in farming and to do so by operating on a larger scale than their family patrimony permits, to acquire control over the requisite land areas, many of which will fall vacant as heirs to neighbouring farms decide to leave because they realise that they cannot get reasonably large farms. The debate is open also in the United States about the role of farm ownership in the scheme of modern farming. The more capital-intensive the farm industry becomes, and the smaller the earnings of farm operators are in relation to the total volume of gross turnover, the less likely it becomes that an individual can own all the capital he needs for a fullsized farm - even through a lifetime of family savings. The alternative to tenancy in the traditional sense might be in some kind of funded debt. (1)

The question of consolidation of fragmented farms is in the main limited to the continental parts of Europe ; in North America as well as on the British Isles and in Scandinavia, it is insignificant. The connected problem of rational layout of land parcels, roads, ditches etc. is more widespread. Reshaping the layout, whether for consolidation or not, is an investment and often an expensive one. Its slow progress in most countries in Europe is in part justified by this, and by the fact that this investment if done hastily, may prove obsolete before it has paid its way. Systematic exploratory research on land layout has been done mainly in the Netherlands and Sweden. It would need to be done in more places and with regard to more alternative situations.

4. Supersession of investments

This problem is common to agriculture and other industries. It gets some peculiar features in agriculture from the degree to which agriculture is a long-term venture, with resources that cannot, in most cases, be diverted to alternative uses. It also gets woven up with the farm size and tenure problems.

In its simplest form we may quote the spread of corn combines in the United States. In Illinois, for instance, only about one-fourth of the grain corn crop is as yet harvested by combines despite the fact that basically the same self-propelled machine can be used as for small grains and soybeans. The main reason is in the presence of investments which are not yet ready to be scrapped - the older models of corn harvesters, and also the types of corn storage facilities adapted to storing ear corn rather than shelled corn. Even though the new technology does a better and more economical job, it will not produce a commensurate benefit to the farmer who would have to scrap previously acquired equipment long before it has ceased to be serviceable.

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(1) A funded debt is a debt which is not intended for repayment but solely to serve as a basis for payments of interest or dividends indefinitely. For instance, the capital of a joint-stock company is technically a debt owed to the stock-holders who do not look forward to re-payment of the principal as long as the company remains in business. A similar arrangement for agricultural firms could alter many of the economic relationships in agriculture.

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In much sharper form the same problem attaches to farm buildings in general, and especially those needed for animal husbandry in a cool climate. Also tree crops raise similar problems. The layout of farms with their buildings, roads, fences and other durable installations cannot be changed over night. This problem was recently discussed with reference to England but is of varying importance in many parts of Europe and America. The possible scope of reduction in labour requirements is thus tied in, to some extent, with the pace at which old facilities can be scrapped and new ones, on a larger scale, be financed. The issue tends to increase the importance of just what farm structure policy (if any) the public powers adopt, and also of the consequences of having no such policy.

5. Financing problems

The creation of larger farms is often financially difficult for those remaining in agriculture. Special credit arrangements and measures to facilitate access to suitable land parcels are applied to some extent in certain countries. This would tend to influence the rate of exodus since those leaving farming can do so more willingly if there is less uncertainty about transfer of property.

6. Population decline and regional planning

The question of declining farm population takes on a special significance in areas where it also means declining population in general. This tends to be so in areas where agriculture is the only industry of any significance. Rural towns then live from servicing the farmers, and reductions in the number of the latter also means that part of the service personnel in the villages becomes redundant. This again has repercussions on the tax basis and on the possibility to finance basic facilities ("infra-structure"). It is not enough to assume that, as farmers become fewer they also get higher incomes, because the compensation may be very incomplete. A higher level of capital intensity means that a larger part of gross turnover has to be paid to those who supply farm requisites, which may leave a smaller part (relatively, or even absolutely) as personal income of farmers and their workers. If the farm requisite factories are located far away, the increase in their factor income is no comfort to the rural area being depopulated.

Together with this purely economic problem goes a human one : with declining population and faltering economic basis for financing infra-structure, the area becomes less of an attractive home country and may even face difficulties of retaining those inhabitants who still have an economically remunerative job to do. The question of how such rural areas can remain "livable in" has been discussed even in a country as densely settled as the Netherlands; it was pointed out that the idea of what facilities a rural area should have is one that changes with the rising level of living elsewhere. (1) In the agricultural areas of north-western Europe, the problem would seem to be no worse than it is, for instance, in the central parts of the Corn Belt in the United States : where the land is fertile, the farmsteads do not become so exceedingly sparse that the distances are not readily overcome by the automobile (which the enlarged farms can afford) and the highroads connecting the open country with the expanding and vital one among the country towns.

The problem of how "livable in" an area can be in the future is more problematic in areas where the use of land for agriculture is marginal in one sense or another. In the American Wheat Belt, some of the policy battles go precisely about this issue : what areas are to remain under a system of coherent settlement, as contrasted to the semi-wild state on vast cattle ranches. In Sweden, the current policy line is resolutely to allow the vast forest areas to be or to become areas of forest monoculture with sprinklings of recreation activities ; railways and trunk roads have then to be maintained at the expense of the country at large, their justification being partly military and partly in general economic policy.

It is easy to say "industrial decentralisation", and where it can be brought about it will of course solve many of the problems of regional planning ; and with increasing population density in general, some of this decentralisation will also make economic sense. Where commodity producing industries are not available , service activities would also help. Much of the peasant farming still going on in the Alps is in some way auxiliary to the tourist industry. The line might be fortified by introducing more tourism as a side line in the activity of the mountain farmers themselves. In the country note on the United States, reference is made to a boarding service on farms which has begun to spread in the hilly and less fertile parts of Ohio. Schemes of this type could be feasible in some areas where the land itself is marginal but the landscape has scenic value. Their quantitative impact will be relatively larger, the fewer the remaining farmers are in comparison with their prospective guests from the cities.

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(1) E. Tonkens : "De leefbaarheid van het platteland", in "Landbouw en platteland in een stroomversnelling", Haarlem 1963, pp. 181-194 ; cf also A. Maris : "Ontwikkelingen op het Nederlanse platteland", ibid., pp. 168-176.

Chapter 5

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

1. Summary and conclusions

Three main areas were scrutinised : the size, recent changes and probable future changes of the agricultural labour force ; the economic forces tending towards such change ; and the technical requirements for labour in agriculture. A fourth group of problems, obstacles which hinder the economic adjustment of labour in agriculture, was surveyed in broad qualitative terms, leaving any quantitative analysis to later studies.

Much attention was paid to the problems of measuring and defining the agricultural labour force and to the statistical treatment of labour force data and related information.

The exodus from agriculture has recently accelerated in several countries. The highest rate of decrease in excess of 5 per cent per year (compound rate) over the nineteen-fifties occurred in the United States. In Canada and several countries in Western Europe (including Italy) the rate in the last decade has been approximately 3 per cent per year. Lower rates have occurred in the United Kingdom, Ireland and most of southern Europe. An increase in the agricultural labour force occurred in Turkey, and to a small extent, in Greece. Demographic data indicate that, in general, for the period 1960-70 agricultural population may decline by a further 25 to 30 per cent.

This outflow of labour from agriculture has contributed to the labour supply in other industries. The transfer of labour from agriculture during the 1950's has affected from 5 to 8 per cent of the total labour force in several west European countries, 3 per cent in the United States and 1 per cent in the United Kingdom. In comparison, in Yugoslavia where about half the population is engaged in agriculture, 17 per cent of the total labour force were transferred from agriculture to other industries during the decade.

The migration of labour from agriculture has modified the structure of the agricultural population resulting in a decreased percentage of young adults and increased percentages of other age groups. For this reason in several countries a certain decline of the agricultural population can be expected in the medium-term future. In certain countries too, wage workers are now a smaller proportion of the agricultural labour force. Consequently, in most O.E.C.D. countries, farming has increasingly become a family-scale industry.

The exodus from the agricultural sector can largely be explained by the unfavourable position of agricultural incomes as compared to those in other sectors. The income effect is itself a resultant of the rapid rise in agricultural productivity together with the relative decline in the role of agriculture in the overall economy. Obviously a situation of labour surplus in a particular sector will have a depressing effect on incomes in that sector. Any attempt at obtaining parity income for agriculture would, if the farm labour force remained constant, lead to a cumulatively growing burden of income support on society in general. As improvement in productivity is continuous, the past exodus of labour from agriculture had done no more than lessen the surplus labour problem.

The economic forces behind the exodus can be expected to continue well beyond 1970. Even if there are important changes in the import - export position of certain countries, this will result in only minor modifications to the exodus from the agricultural labour force within these countries. The end result of this exodus is not in sight, but in any case, it will mean a very much smaller farm labour force.

Matching the estimates of possible future income perspectives is the measurement of the need for labour in agriculture in the medium and longer-term future. Current data on technical efficiency norms for farm labour in various crop and livestock enterprises only lead to estimates of the magnitude of the present labour surplus. Rough measures of technical efficiency that can be achieved in future indicate that the scope for reduction of the agricultural labour force is very large. The technical need for labour is not likely to present any major obstacle to reductions in the farm labour force of the magnitude discussed here for the decade ahead, or for considerable reductions thereafter.

Recent and current changes in the agricultural labour force in industrialized countries represent a specific stage in the normal course of economic development. When the farm sector is smaller than the other sectors, its surplus of labour can find employment in other sectors of the economy. At the same time, the relatively large size of the industrial and service sectors makes it praticable to supply adequate quantities of the goods and services needed to replace large numbers of agricultural workers. The net result for society as a whole is rising productivity both in agriculture and in other industries, as well as an improvement in the economic system as a whole. Agricultural exodus is a normal part of economic changes leading towards higher levels of living for all groups in society.

There is no particular reason why a country should fear to have too few farmers in the future. In case of any impending scarcity of farm labour, two things would probably occur : the infusion of capital per man would be accelerated, and farming would become sufficiently remunerative - as a technical profession requiring considerable skill - to attract candidates from other occupations, especially rural youth working in farm-related occupations.

Among the obstacles to a rapid removal of a labour surplus and to economic adjustment, consideration was given to :

(a) The age and sex distribution of agricultural workers ;

(b) The seasonal distribution of the work load ;

(c) The size, tenure structure and layout of farm holdings ;

(d) The lack of mobility of resources other than labour ;

(e) The difficulty of obtaining credit with which to finance larger operational units with greater capital intensity ;

(f) The greater tendency for hired workers and unpaid family workers to leave compared to owner-occupiers and tenant farmers ;

(g) The shortage of educational and training facilities and occupational guidance centers.

The social consequences of a continued exodus and the need for measures to smooth the transition, were also discussed briefly. Major regional differences were considered and it was observed that continued adjustment of labour and land resources, may lead to modifications in the degree of regional specialization. A particular problem occurs when the agricultural exodus (and adjustment in general) leads to a decline in the population and volume of economic activity in an area, thus causing stresses on the infrastructure and calling for a re-planning of the economic life of the area.

The human consequences of agricultural exodus - the effect upon traditional values, as well as upon the welfare of individuals - were not treated separately. It was realised that these viewpoints must constantly be kept in mind in any study, and in any course of action, dealing with human affairs.

2. Recommendations

The analysis in this report gives rise to a number of suggestions for action and inquiry. They fall into two main groups of recommandations ; i.e. those on policy and those on further data gathering and analysis.

Policy recommendations

These are perforce broad in character and should be regarded as suggestions for policy orientation rather than as direct advice on concrete measures. The latter obviously have to be modelled to fit the situation of each country, or sometimes even of each region. With this general reserve, the following are recommended.

(a) The trend towards fewer workers in agriculture should be recognized as a normal part of modern economic development. Policy should not aim at halting this trend but rather at channelling it, and making it as smooth and beneficial as possible.

(b) Mobility of manpower, out of and into as well as within agriculture, should be recognized as beneficial to economic growth, and policy measures should be oriented towards, among other things, promoting mobility.

(c) Among measures to promote adjustment of labour in agriculture, high priority should be given to the problem of adjusting the farm size. A conscious farm-size policy should not only be directed towards creating farms of more adequate size, but also towards facilitating successive adjustments in later phases.

(d) Measures to promote adjustment of farm size should include facilities for closing down uneconomic holdings and transferring the land (if still suitable for agriculture) to more adequately sized farms. Special agencies such as those at work in France, the Netherlands, and Sweden will be useful for this purpose. It may however also be necessary to mobilize the land market where it is not sufficiently active. Special financing will be necessary in some cases to build up the larger farms of the future. Arrangements of "funded debt" and modified tenure conditions should also be contemplated as possible solutions.

(e) Local co-operation, or group action between neighbours, in such activities as machine ownership, investment in certain types of buildings, etc., should be encouraged as one of the possible avenues for future farm size adjustment which would facilitate labour mobility.

(f) Co-operative processing plants for agricultural produce and other directly farm-related industries, should be encouraged as a partial solution to the problem of procuring alternative employment, especially in farming areas where such opportunity is insufficient.

(g) Programs of rural education should include a higher level of general education similar to that in the urban areas, direct job training for agriculture and for other occupations, re-training in adequate industrial training centers for farm workers who want other occupations, and occupational guidance. The latter should also include, for those who wish to farm, information on becoming established in farming - the capital and skills required, and the chances of success.

(h) Programs of regional economic planning should introduce new lines of economic activity into areas threatened with depopulation, rather than attempt to retain numerous farmers at any cost. Part-time work outside agriculture may be a partial solution in areas particularly suitable for tourism or those well suited to establishment of local farm-related industries, but they should not be introduced or maintained in areas where they hamper the economic efficiency of farming or slow down any desirable mobility of labour.

Recommendations for data gathering and study

The information already available is substantial and will allow important analytical studies to be made. This report has only touched the surface and much more precise and detailed analyses are, in many cases, already at hand. There are nevertheless important gaps which occur in several countries. The following are some brief indications of the improvement of statistics and expansion of analytical studies that can be specifically recommended :

(a) In general, research on agricultural economics and related subjects, needs to be more oriented towards research on adjustment problems than heretofore.

(b) Censuses of population and agriculture should be more closely linked to allow reconciliation of their data, using uniform and objective criteria for classification of employment in agriculture and of dual employment.

(c) Movements of people between industries should also be explored by continuing surveys (similar to the U.S. enquiry based on social-security data) to enable the same individuals to be followed from year to year and thus gauge the real degree of occupational mobility.

(d) The characteristics of farms should be further illustrated in agricultural censuses by appropriate cross-classification. The various categories of agricultural workers in the labour force should be classified against other data.

(e) The general question of farm size (one-family farms, two-family farms, labour hire farms) and their adequacy now and in the future should be studied in order to provide a basis for future farm structure policy.

(f) Part-time farming and dual employment should be studied in order to show the extent to which they help or hinder labour mobility and agricultural adjustment.

(g) Work-study material should be processed into tools for the measurement of underemployment, having regard to both the factor-price situation and the organizational structure of agriculture at each stage of development.

(h) The problem of regional planning, especially in rural depopulation areas, should be studied from the viewpoint of the net effect which alternative solutions may have on the economic system as a whole.

(i) Special studies should be made to show the total net benefit to the community of the current process of substituting capital for labour in agriculture.

COUNTRY

CHAPTERS

DENMARK

Danish agriculture started into the present phase of structure change with a higher productivity than was found in most countries in Europe, with less of an underemployment or income disparity problem, and with a more adequate structure than was found in most European countries. Its evolution to date is characteristic of both the strength and the problems of an outspoken family-farm, family-ownership system of farming. Its further adaptation will reveal much about the viability of such a system under conditions of dynamic change.

The labour force

Recent changes in farm labour force are shown in Table 1. (1)

Table 1

Denmark : Farm labour force, thousands of man-years

Year	Farmer and wife	Children and relatives	Non-family workers	Total	Non-family workers as % of total
1939/40	181	103	194	478	40.6
1949/50	188	63	146	397	36.8
1959/60	170	38	92	300	30.7

Source : Landrugets arbejdskraft. Copenhagen, Det Statistiske Department, 1961, pp. 23-26.

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(1) The 1960 census of population is not yet available. In the meantime, the Danish estimates of man-years of work are the meaningful expression of the movements of the farm labour force.

The rapid and even reduction of the farm labour force by nearly 40 per cent of its strength two decades ago, or by 2/3 as many man-years as those still remaining, depends mainly on the relatively even more rapid reduction in the number of wage workers and unpaid family workers. That these two categories have been reduced at a parallel rate is significant, since the hired work force consists in part of farmers' sons who are working away from home some part of their younger years. The work contribution by farmers and their wives, on the other hand, has gone down only slightly and only in the period after 1950, when also the number of small holdings began to be somewhat reduced. Thus far, the changes in number and size of farms have been moderate, however, at least to the extent it is recorded.

Information on operators by age is expected to be obtained from the 1960 Census of population (1).

Income projections

Expansion of agricultural exports has played a large part in the past history of Danish agriculture. The achievement of near-parity of incomes with other groups in society in the early fifties depended in a large measure on this. In the most recent years, there has again been some loss of income parity, largely because of the difficulty to maintain the price level on the export markets.

The prospects for continued export expansion are naturally judged differently in a country like Denmark, where exports are a very large part of total output and where at the same time even the total exports are a moderate part of the offerings on the world markets. If it is assumed that the export volume will just be maintained but not increased, then total output could only expand at about 1/2 per cent per year on account of the increase in domestic demand ; if exports were to expand by 35 per cent over 20 years, the output could be increased by 2 1/2 to 3 per cent per year over the same period (2). Based on these prospects, it has been calculated that, in order to maintain approximate income parity, the number of workers should go down by 3.7 per cent per year in the former case and by 2.7 per cent in the case of export expansion. The number of man-years employed in Danish agriculture would then reach 205 or 230 thousand in 1970 and 145 or 175 thousand in 1980 (2). The latter two figures could then include 100-125 thousand man-years of operators' labour and 45-50 thousand units or other workers (farmers' sons and hired workers).

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(1) The 1960 census of population is not yet available. In the meantime, the Danish estimates of man-years of work are the meaningful expression of the movements of the farm labour force.

(2) K. Skovgaard : "Bliver der mangel paa landmaend i 1980 ?" ("Shortage of farmers in 1980 ?"), in "Tidsskrift for landøkonomi", Nr 7, 1962, pp. 329 sq.

Labour requirements

The standards of labour efficiency in Danish agriculture are relatively well explored. Based on the most recently published figures for work norms, labour available and needed has been computed, by size of farm, for 1959. The result is shown in Table 2, in comparison with an earlier computation of the same kind for 1951 (1).

Table 2

Denmark : Manpower available and needed by size of farm, 1951 and 1959
(Data in thousands of man-years;000's omitted)

Size of farm, ha.	1951		1959	
	Available	Needed	Available	Needed
0.55-5	46	21	34	12
5-10	76	58	63	40
10-15.	53	48	43	34
15-30.	119	110	86	76
30-60.	72	77	52	50
60-120	18	20	13	13
120 and over	14	14	9	10
Total	398	349	300	235
Sub-totals :				
0.55-15.	175	127	140	86
15 and over.	223	221	160	149

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(1) The most recent version of the Danish work norms in "Undersøgelser over landbrugets driftsforhold. Periodiske beretninger". 16. Arbejdsforbrug ved forskellige landbrugsarbejder. Copenhagen 1962.

The table shows an essentially analogous distribution of both labour available and labour needed at the two points in time, although both quantities have declined considerably. There is one difference however : the computed magnitude of the labour surplus has grown from 12 per cent in 1951 to 22 per cent in 1959. The exact figure should not be trusted too much in a computation of this kind. But the tendency is clear enough and is too accentuated to be overlooked. It is the logical consequence of the fact that the input of operators' labour, and the number of farm holdings, has declined much less than the total volume of labour force and effective employment. The discrepancy between labour available and needed on the smaller farms has widened. In 1951 it was in part compensated for by somewhat higher yields on small farms, but this factor, if it still obtains, must be much less significant in 1959 when the discrepancy is so much wider.

The manner in which family labour becomes "squeezed in" on small farms can be studied from the farm-size distribution of labour force by categories, as shown in Table 3.

Table 3

Denmark : Farm labour input
by size of farm and category of worker, in 1959/60
(in thousands of man-years ; 000's omitted)

Size of farm, ha	Farmer and wife	Children and relatives	Non-family workers	Total	Man-years per	
					Farm	100 ha
0.55-5	31	1	2	34	1.0	32
5-10	53	5	4	63	1.2	16.2
10-15.	30	6	7	43	1.3	10.8
15-30.	41	16	30	86	1.8	8.4
30-60.	13	3	31	52	2.7	6.8
60-120	1	1	11	13	4.3	5.6
120 and over .	.05	.2	9	9	10.1	4.8
Total . .	170	38	92	300		

Note : Figures may no add up exactly due to rounding.

Source : Landbrugets arbejdskraft, Copenhagen, Det Statistiske Department, 1961, p. 17, Table 21, and p. 18, Table 22.

As could be expected, the size-classes where most of the surplus exists are those where hired labour plays a minor role. The surplus in most cases takes the form of operators who have smaller holdings than needed for full employment, under the standards of efficiency attained on the medium-sized and larger farms.

There is no particular reason why Danish agriculture should not continue to avail itself of the most high-productive techniques that are or will become available ; topography as well as the leading lines of production are well adapted to highly mechanised operations. Current discussion in the country does not seem to call this in question either. What has been discussed to some extent is the size and nature of the socio-economic gain derived from the increasing substitution of capital for labour. A recent inquiry indicated that, from the viewpoint of the national economy in general, the substitution process were to have led to no sizeable gain or loss up until 1950, while the last decade should have seen a gain of 35-40 per cent in the rate of output per unit of accumulated labour. (1) The inquiry was made in rather simplified terms, however, and there are several reasons why the gain shown ought to be higher, and there should have been some before 1950 too. (2)

Obstacles, consequences and objections

A retarding circumstance in the adjustment of farm sizes has no doubt been in the age distribution of the present holders. The impact of aging is likely to become more salient in the next ten years.

An obstacle of somewhat different nature is in the land policy which is continued from periods when the maintaining of a large number of independent farm holders and small holders had a different economic rationale than it has now. A recent proposal for modification of the legal rules on division and amalgamation of holdings aimed at opening the path for some of the farm enlargement which appears needed and some of which goes on in disquise. (1) No positive action has followed to date, and it may last some time before the issue becomes urgent enough to make new legislation inevitable.

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(1) H. Gad : "Landbrugsbefolkningens tilpasning til erhvervets aendrede vilkar", in "Tidsskrift for landøkonomi" 1963 : 3, pp. 123 sqq. (especially pp. 129 sq).

(2) Among other things, the author based the calculation of "accumulated labour" on the full price of external inputs, rather than on labour's share in their production ; no reduction was made for the opportunity cost aspect of agricultural exports ; and farm labour was computed from its normal wage cost rather than actual input ; all of which tends to under-estimate the gain.

It is of interest in this connection to examine the consequences for the farm structure that would be likely to follow from the trend projections discussed in the above, provided that the formation and enlargement of farm holdings were left to market forces rather than decided by legal rules on minimum and maximum size of farms. The wide-spread notion that this would lead to a system of "large-scale" farming has little support in the recent trend towards fewer and fewer wage workers in agriculture, and it also has little support in agricultural technology or in the economics of the farm firm. A projection of future farm sizes, when the average size were approximately doubled, has been made by aid of a distribution diagram and is shown in Table 4. (2)

Table 4

Denmark : Farm numbers by size, 1960 and projection for future stage of 100 thousand farms averaging 30 hectares in size (average 1960 : 15.8 ha)

Size of farm, ha	Number of farms		Farm acreage (000 ha)	
	1960	Projected	1960	Projected
Under 5	37,140	10,000	107	30
5-10	54,346	10,000	389	70
10-15	32,671	17,000	393	200
15-30	48,482	29,000	1,023	600
30-60	19,622	23,000	771	900
60-120	2,948	9,300	227	750
120 and over	867	1,700	184	450
Total	196,076	100,000	3,094	3,000

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(1) cf. Betaenkning afgivet af Landbokommissionen af 1960. 1. Om brugsstørrelser ... Copenhagen 1962.

(2) On the technique of projection, see F. Dovring : "Farm size data : frequency distribution, interpolation, and projection", University of Illinois, Department of agricultural economics, A.E.R.R. 50, 1962.

The future size of 30 hectares was chosen because it can be brought in harmony with the most extreme among the projections of manpower for 1980 that was quoted above. The far horizon of 1980 was chosen in this case because it has already been discussed in the country and because evidence of reasonable consistency in the various estimates for that horizon will, a fortiori, support an intermediate projection for 1970.

Assuming a somewhat even degree of productivity increase, and distributing the manpower thus needed by farm sizes, and within farm sizes among worker categories, in analogy with the known structures of the present and the past, the following projection emerges of manpower by size of farm at the time when the farm structure has arrived at the distribution shown in the preceding table.

Table 5

Denmark : Projection of farm labour available at future stage of 100 thousand farms
(tentatively assumed to be possibly around 1980)
(Manpower in thousands of man-years, 000's omitted)

Size of farm, ha	Manpower available			
	Farmer and wife	Children and relatives	Non-family workers	Total
Under 5	7	-	-	7
5-10	9	-	-	9
10-15	15	-	-	15
15-30	30	5	-	35
30-60	23	10	6	39
60-120	9	8	11	28
120 and over	2	2	8	12
Total	95	25	25	145

The projected figures refer to labour available. There might still be a slight labour surplus due to the small size of most farms in terms of manpower, but in absolute figures it ought to be very small.

In terms of output per worker, this projection should imply a level similar to that obtained in the United States at present.

A striking conclusion is that the farms which are counted as middle-sized under present conditions, those between 15 and 60 hectares, would still employ over half the labour force and have about half the farm land area. The open-ended group, 120 hectares and over, would have increased strongly in relative terms but would still represent only a small share of all resources in Danish agriculture.

There are few obstacles of a cultural nature, as the Danish schooling system lays a basis for enough versatility for farm workers to be, on the whole, capable of handling also other types of jobs. There might be a certain problem in regional development. The larger half-part of the country, Jutland, has almost no industry, and a further thinning out of its farm population might create some of the general problems of depopulation discussed in the main report. The small size of the country, and rapid communications, make this less of a problem than in countries with vaster distances or more broken topography.

One of the main economic problems in any re-structuring of the farm size pattern is in the capital sunk into farm buildings. In Denmark this is particularly important because of the heavy emphasis on animal husbandry and the solid kind of buildings needed in a cool-temperate climate. However, in Denmark considerable investments in new farm buildings will be needed at any rate. A large part of all the farm buildings in the country are old, a large proportion are from the 19th century. Moreover, there was a backlog of replacement during the 1930's and 1940's, and the rate of replacement, in the years 1947-54 was of the magnitude of 1 per cent per year. (1) It has been slightly higher since then, but not much. (2) In these circumstances the necessary re-structuring of farm size may not have to contend with as much of a problem of supersession of fixed investments as might have been the case. But this is on condition that the decision is taken fairly soon as to what structural policy to follow. If investments are made over the next ten years on the assumption of more farms to survive than later turns out to be realistic, then some sizeable amount of misdirected investment may have been made before the mistake can be corrected.

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(1) K. Skovgaard and L. Buch : "Landbrugets bygninger. En undersøgelse af landbrugsbygningernes fordeling efter alder og byggemaade." Copenhagen 1952. 2 "En beregning af landbrugsbygningernes økonomiske reproduktionsvaerdi." Copenhagen 1957.

(2) Landbrugsstatistik 1961, pp. 141 sqq.

FRANCE

The agricultural labour force and its changes

Decrease in the agricultural labour force in France began already as a consequence of war losses 1914-18, which are still visible in the age composition of the French farm population. The number of male workers in agriculture (without distinction as to age) had remained static, close to 5 1/2 million throughout the late part of the 19th century and until 1911 ; in 1921, the number was somewhat lower and fell further to 4 1/4 million in 1936, and about the same number was again enumerated in 1946. In the immediate post-war period, up to 1954, exodus from agriculture was moderate but accelerated in more recent years. Already a labour force inquiry in 1960 showed that more people had left agriculture than had been anticipated on the basis of past trends. (1) The recently available data from the 1962 census of population reveal even more accelerated decline. A condensed version of the age distribution of male workers in agriculture according to the last three censuses of population is shown in Table 1.

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(1) B. Mendès-France et B. Grais : "Enquete emploi d'octobre 1960, "1ère partie", in "Etudes statistiques" April/June 1962, cf. also M. Febvay : "La population agricole française, structure actuelle et évolution", in "Etudes et Conjoncture", August 1956 ; ibidem "Perspectives de la population française, jusqu'en 1980", in "Etudes statistiques" 1960 : 2 ; R. Pressat : "Evolution future de l'emploi en France (1960-1970)", in "Population" (Paris) April/May 1960 ; and ibidem, "Structure démographique de la population active agricole", in "Economie rurale" 37, July 1958.

Table 1

France : Male workers in agriculture 1946, 1954 and 1962, by age and projection for 1972

(Data in thousands, 000's omitted)

Age (years)	1946	1954	1962	1972 (projection)
Under 15	74	..	..	..
15-24	890	587	268	480
25-44	1,339	1,168	989	870
45-64	1,158	1,202	1,051	880
65 and over	578	337	269	..
ND	3	-	-	-
Total.	4,042	3,321	2,577	..
Sub-total : 15-64	3,387	2,957	2,308	2,230

Higher school attendance has reduced the apparent labour force participation of those below 15 years of age, until the last census no longer enumerates them. Also the category above 65 years of age seems to have been reduced as a consequence of some change of attitude towards retirement (traditionally, a French farm holder always remained "chef de famille" throughout his life and therefore was returned as "active" even though over 80 years old). Even in 1962, there were 59 thousand "active males" in agriculture aged 75 and over, against 46 thousand in all other activities taken together in the age stratum.

The projection to 1972 has been done on the "no-exodus" assumption and serves to show that even in this case there would be a slight reduction because of aging. Needless to say, the "no-exodus" assumption is hardly realistic in showing a renewed increase among young farm workers.

A more detailed age classification, according to the 1962 census is shown in Table 2, with comparison of agricultural and total male workers.

Table 2

France : Total and agricultural male labour force in 1962, by age
(Data in thousands, 000's omitted)

Age (years)	Total	Agricultural	Agricultural as % of total
15-19	853	170	19.9
20-24	724	98	13.7
25-29	1,459	209	14.3
30-34	1,630	256	19.4
35-39	1,594	286	17.9
40-44	1,353	237	17.5
45-49	1,036	183	17.5
50-54	1,334	292	21.2
55-59	1,154	305	26.4
60-64	846	271	32.0
65 and over	595	269	45.2
Total	12,578	2,577	20.5
Sub-total : 15-65	11,983	2,308	19.3

As is normal in an agricultural population with rapid exodus in the recent past, the lowest percentage share in total population is not among the teenages but among the young adults. That teenagers have a percentage close to the general average is logical since they do not migrate on their own ; they are the children of farmers in many age groups. It is those aged 20-30 that have been most radically thinned out, reflecting an increasing tendency among French farm youth to prefer another occupation unless a farm of some considerable size appears available to them in the near future. That this does not always mean an immediate change of residence can be seen from a comparison between data on agricultural labour force and the population of agricultural households. The latter concept turns out to have larger numbers in the age groups 20-30 than would be expected from the data on active population (in appearance, the "activity ratios" in those age groups would be abnormally low in agriculture and abnormally high in other walks of life).

The social composition of the farm workers can also be studied by age (see Table 3).

Table 3

France : Male workers in agriculture in 1962
(by age and by position in the industry)

Age (years)	Employers and own-account workers	Unpaid family workers	Wage workers	Total (thousands)	Wage workers as per cent of total
15-19 . . .	3,600	95,120	71,080	170	41.9
20-24 . . .	8,280	53,760	36,360	98	36.9
25-29 . . .	54,160	75,640	79,440	209	35.4
30-34 . . .	106,400	55,920	93,840	256	36.6
35-39 . . .	150,080	42,100	93,560	286	32.8
40-44 . . .	141,260	20,180	75,940	237	31.9
45-49 . . .	118,760	8,660	55,660	183	30.4
50-54 . . .	207,620	10,980	73,640	292	25.2
55-59 . . .	224,480	10,140	70,160	305	23.2
60-64 . . .	207,860	8,580	54,440	271	20.1
65 and over	227,920	13,240	28,220	269	10.5
Total . . .	1,450,420	394,320	732,340	2,577	28.4
Sub-total : 15-65 . . .	1,222,500	381,080	704,120	2,308	30.5

The variation by age of the percentage of wage workers reveals nothing startling. The slow decrease with increasing age might simply mean that some wage workers are farm heirs working for wages, or otherwise succeed in advancing to farm operators. That wage workers in France, in contrast to several other countries, have not declined much faster than the agricultural labour force in general, can also be brought in evidence (see Table 4).

Table 4

France : Male workers in agriculture in 1954 and 1962 by position in the industry
(Data in thousands)

Category	1954	1962	Rate of decrease, per cent
(a) Farm operators	1,638	1,449	11.5
(b) Unpaid family workers .	685	394	42.5
(a) + (b)	2,323	1,843	20.7
(c) Wage workers	998	739	25.9
Total.	3,321	2,582	22.3

Source : Bulletin hebdomadaire de statistique, No. 781, 8th June, 1963. Note : Being preliminary, these data may differ slightly from those shown in the other tables.

The rate of decrease of wage workers is still somewhat higher than average ; they declined from 30.2 per cent to 29.0 per cent of the total from 1954 to 1962. But operators, for generally known reasons, are more difficult to displace and the mere aging of the agricultural population would lead to a more pronounced decline among those who are at present farm operators - that is, for natural reasons the population of farmers and their sons would go down somewhat more thant that of wage workers. Unless the figures conceal an increased tendency for farm heirs to work for wages, the demographic movement would again raise the percentage of wage workers, at least to their share in 1954. (See also Table 1 above for projection to 1972).

Further reduction in the French farm labour force, beyond the effect of aging, is to be expected for two kinds of reason : the low number of unpaid family workers in many areas (low "generation pressure") and the still large numbers of wage workers, many of whom are likely to be displaced by further mechanisation.

From Table 3 above it can be seen that the number of farm operators aged 60 and over is larger than the entire number of male unpaid family workers. Some of the latter are of course already de facto substituting for aging heads of household, while a smaller number of them is not in effect waiting for any farm to inherit. The generation pressure is thus relatively low in the country as a whole. This becomes even more apparent when data are studied by geographic subdivisions. Apart from the 90 departments, which would be cumbersome to analyse, the census now also supplies data by "régions de programme", units used in national planning ; 22 such regions consist of one or several departments each.

In the country as a whole, male unpaid family workers amount to about 27 per cent of the number of male farm operators. Percentages much below this average (generation pressure even lower than average) are found in the Mediterranean regions and in the region immediately around Paris, to a lesser degree also in other parts of north-central France. Percentages higher than average (generation pressure not as low as in the country at large) are found in some of the less prosperous farming areas, such as Bretagne and Midi-Pyrénées. Despite this, a spot inquiry in the last mentioned region revealed that at least locally the generation pressure was low - despite the fact that many farm boys were still living on the farms of their parents, many of them had decided to leave, unless a farm could be available to them that was considerably larger than the average of those in existence (1).

The distribution of wage workers shows an inverse pattern. In the country as a whole, wage workers are 28 per cent of the total. While many regions have approximately the percentage of the national average, there are also notable variations. Much higher percentages are found in the Mediterranean regions, around Paris and in Picardie (north of Paris), to a lesser extent in north-central France generally. Percentages much below the national average are found in Alsace, Franche-Comté, Bretagne, Midi-Pyrénées and Rhône-Alpes.

The apparent paradox thus emerges that the generation pressure should be lowest where the farms are largest and use the most of hired labour. Unless this conceals some internal movement of young farm people, the interpretation being closest at hand would be that the youth of the more prosperous farm areas are more aware of possibilities elsewhere than those in poorer, more purely agricultural regions. If this is true, then the present structure certainly allows to anticipate a considerable reduction in the number of farm operators in the near future, since also in the poorer areas the farm youth seems to become more and more aware of their alternatives.

That hired workers are most numerous also in the areas of relatively large farms, many of whom are well under way towards a high level of mechanisation, is also a fact that allows to anticipate a continued strong decrease in the number of hired workers - so much the more so as the decision is sometimes taken by the employers rather than by the workers themselves.

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(1) A. Brun : "Essai d'analyse d'une population agricole. Le canton de Caraman en Lauruguais." Paris, Institut National de la recherche agronomique, Mai 1963 (mimeogr).

The real level of generation pressure on French farms is shown also by a special table (available for the country as a whole only) showing the number of farm operators and their number of "fils de ménage" - classified as 0, 1, 2, or 3 or more. Out of 1 1/2 million farm operators, no less than 2/3 million are classified as having zero "fils de ménage". Distribution by age of the farmer shows nothing in particular, except that also younger and middle-aged adults often have no "fils de ménage" ; but distribution by size of the farm reveals that zero "fils de ménage" is most frequent on the smallest farms and becomes less and less frequent with increasing size of the farm ; also the frequency of higher numbers of "fils de ménage" per household tends to increase with farm size. The trend is of course not only demographic but regards also the propensity of sons to remain in the household. Even so, some of them may already be working in some other occupation, as was discussed above. These data, despite the large deficit of farm successors which they show, still tend to understate the real size of this deficit. In the lower size classes, it is evident that a large part of the farms are held by aging operators with no successors, and that a sharp decline in farm numbers is therefore to be expected soon.

Income projections

According to a projection published recently by the secretariat of the E.E.C. (1), the rate of growth in the French economy 1960-70 is anticipated to be between 3.7 - 4.15 per cent per year (G.N.P. per caput), or 4.5 - 4.9 per cent for total G.N.P. The aggregate growth in a decade would be nearly 60 per cent. This indicates a growth rate somewhat higher than the O.E.C.D. growth target.

The French population increases by nearly 1 per cent per year, and the income level is not yet quite high enough to exclude a certain elasticity in the demand for food. On the other hand, rising capital intensity will no doubt claim its share in increased farm output, especially if the agricultural population continues to decrease, as appears likely from its composition.

Assuming that agricultural net value added can be made to grow by 1 per cent per year in constant terms (and without discussing, for the moment, the terms of trade of the export prospects), then rising agricultural production can contribute only 10-11 per cent of the anticipated rise in per caput income of some 45-50 per cent. Consequently, we could compute the population that can have a rate of risein income proportionate to that in the economy in general, by the expression

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(1) Communauté Economique Européenne. Commission : "Les perspectives de développement économique dans la C.E.E. de 1960 à 1970". Brussels 1962, p. 72.

$$\frac{110 \text{ to } 111}{145 \text{ to } 150} = 0.76 \text{ to } 0.74,$$

indicating that, as far as the reasons accounted for above are sufficient, the agricultural population of 1970 could be 3/4 of that of 1960 (or, that of 1972 over that of 1962). A one-quarter decline (or by nearly 3 per cent per year, compound rate) does not seem excessive or impossible ; the analysis in the preceding chapter makes it quite possible that the decline will be even larger.

This was assuming constant terms of trade and a constant rate of export in relation to total ouput. Taking first the perspective of exports (and still maintaining constant terms of trade), the magnitude of export expansion needed to maintain existing income-parity ratio and maintaining the present size of the agricultural population would require an annual rate of export expansion (as an average over a sequence of years) which would represent a higher percentage of gross output than the incremental rate of net farm income in relation to farm income at the start of the year. For satisfying expansion of domestic demand, an additional 15 per cent in gross output may generate 10-11 per cent additional value added in agriculture (the real net farm income may grow even less, if the industry gets more and more credit financed). But for generating another 35-40 per cent net value added in agriculture, would need something like a 50 per cent increase in gross output over the ten years, in addition to the expansion needed to cover increase in domestic demand.

Expansion of agricultural output on such a scale is in fact anticipated in the Fourth Plan. (1) For the years 1959-65, agricultural output was assumed to expand by 4 1/2 per cent per year, or by more than 30 per cent over the six years ; still a 10 per cent reduction in agricultural labour force was also anticipated, yielding an increase in labour productivity of 6.3 per cent per year.

Such an expansion would not be without repercussions on international markets. Starting with the magnitude of present production, France's agricultural output represents 1/5 that of the United States, or something in excess of 3 per cent of workd production. An incremental 60 per cent to this quantity over ten years would thus mean throwing on the international markets something like 1 1/2 per cent of present world production (at that time, it would be a somewhat lesser percentage, of course). Considering the limited share of all agricultural products that are traded internationally, such a French contribution would indeed loom large in international trade.

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(1) Quatrième Plan de Développement Economique et Social (1962-65), Rapport Général de la Commission de Main-d'Oeuvre, Paris 1961, p. 44, incl. "rectificatif" for p. 44.

The question whether markets could be found cannot be answered here ; it can only be raised. But it stands to reason that such an export expansion could not be accommodated without increased strains on the price levels for agricultural products. The situation of greatly expanded exports would almost certainly also be one of deteriorating terms of trade, which would then defeat the purpose as far as it was to retain an agricultural population of the present magnitude and assure it an income in proportion to the general income rise, and in as far as these objectives are sought without very heavy subsidisation of agricultural incomes.

The need for manpower in agriculture

No comprehensive data on efficiency of labour in French agriculture appear to have been published. Estimates made by M. Coutin have been used in the Fourth Plan as a basis for computing the excess of manpower in agriculture at that time. (1) The estimate shows that there were to have been 2.9 million active males in French agriculture in January 1960, of which nearly 300 thousand were in excess, thus indicating a need for manpower on the magnitude of 2.6 million men.

A similar, but somewhat lower, estimate has been produced on the basis of the 1955 census of agriculture, adjusting the results in such a way that the larger farms (those on which hired labour is a major factor) should show approximate balance between labour available and needed. The results are shown in Table 5.

This table indicates, then, a volume of effective employment close to 2 1/2 million already in 1955. The surplus of manpower, at that time, was to have been of the order of 1/3 of the labour available.

This finding is of course by no means weakened by the results of the 1962 census of population. When there were 2,300 thousand men aged 15-64, this indicates (by adding 20 per cent for other categories) a total manpower strength of 2 3/4 million man-years. As would be expected, the level of efficiency has also risen considerably since 1955. There must still be considerable structural underemployment, both on small farms in general and more specifically in

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(1) Ibid., p. 156.

Table 5

France : Labour available and needed, by size of farms, in 1955

Data in thousands of man-units, (000's omitted)

Size of farm, ha	Labour available	Labour needed
Under 1	71	11
1 - 2	137	40
2 - 5	347	158
5 - 10	657	368
10 - 20	1,034	623
20 - 50	1,056	840
50 - 100	283	288
100 - 200	99	97
200 and over	43	42
Total	3,727	2,467

Sources : Computations based on the "Recensement général de l'agriculture de 1955", Vols : 1 and 3, Paris, INSEE, 1961. The "labour available" was computed as French "labour units" as indicated in Vol. 3 of the census, with deduction of 1 unit per farm for household work (except in the lowest classes where only the female labour returned was deducted, even when this did not amount to 1 unit per holding). The labour needed was first computed according to standards that had been reasonable in the 1940's ; the much too high total obtained was reduced by means of equations showing what rates of improved efficiency in crop farming and in animal husbandry, respectively, would best satisfy the situation of the higher size classes.

some of the poorer small-farm areas. This indicates definitely that the Fourth Plan estimate of 2.6 million man-years as required is now too high. Even if the surplus were now no larger than 20 per cent (which would be a noteworthy improvement, to square poorly with the weakening relative income position), this would indicate 2.2 million man-years as the need at present. It may also be 2 million or even less.

The question arises : can the requirement for labour in French agriculture be very much lowered in the future ?

There are several indications that they can. The calculation for 1955 showed that most of the efficiency gains up to then had been in field crop production. These changes left animal husbandry as by far the largest claimant to direct human labour, with field crops a much smaller sector in direct labour consumption. Tree crops are also a much smaller component in the labour pattern than is the case in Italy or Spain. Subsequent progress, after 1955, is likely to have been most substantial in crop husbandry, as indicated both by continued increase in agricultural machines and land consolidation, and by the usual process of "ripening" in the efficiency of use of equipment already available. The work norms applied to animal husbandry, in the analysis quoted above, were rather low and should allow for considerable improvement. Without going as far as some French agronomists would in adopting the most advanced American techniques at short notice, (1) it is quite reasonable to assume that, given a somewhat adequate pace of modernisation in buildings for animal husbandry, labour requirements for dairy and beef herds and for pig production could be reduced very considerably in the near future. Reducing the requirement for farm labour by 1/4 to 1/3 over the next decade should not be a very extreme achievement for technical reasons.

Obstacles to removing the labour surplus

Among the obstacles usually cited, the farm size structure appears as less of a hurdle in France than in several other countries. There is less of a concentration around the full-sized family farm than in Denmark or Germany, and farms large enough to employ sizeable amounts of wage labour play relatively a larger part. The relatively weak generation pressure, especially on the smaller farms, makes it likely that many of the smaller and medium-sized farms will soon be absorbed into larger units even without too much of a deliberate policy to make it possible.

There may be a financing problem. Rapid accumulation of land into larger holdings could lead to more extensification than is desirable, unless the path were smoothed for those who want to assemble holdings of the size that will employ a farm family (or two families) in the foreseeable future. As this size will be considerably larger than those inherited from the recent past, many of those young farmers who want these larger holdings might find it impossible to finance such a build-up of land capital. Special financing to overcome such obstacles has been proposed by D.R. Bergmann (as quoted by A. Brun, op. cit., p. 21), resembling the innovations in tenure being discussed in the United States at present.

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(1) R. Martinet : "L'influence de la taille des entreprises de production laitière sur leur rentabilité", Bulletin technique du Génie Rural, No. 54, Nov. 1961 (mimeo) ; cf above in the main report, Ch. 3.

Land tenure would otherwise seem to be among the smaller obstacles. When rural exodus includes holders of protected tenancy contracts, much of this land should revert to the owners for free disposal on larger operational units. This is especially important in the farming areas where holdings are already large, as in the Paris basin and northern France generally. The special financing measures will above all be needed in areas where most of the land is owner-operated and the closing down of many small holdings would place many former smallholders (or their heirs) in the unaccustomed position of landlords.

Land fragmentation has been widespread and still is ; most of the sizeable (but not yet decisive) work on land consolidation has been concentrated in northern France, the regions of larger farms. If we are correct in anticipating a very strong decline in numbers of holdings in the areas where there has been but little consolidation to date, this may mean that many consolidations would have been in vain or of short-time effect only ; and the chance comes up, when farms are made considerably larger, that part of the consolidation problem, in the conventional sense, may be circumvented. The need for land layout improvement, which has had little attention in French consolidation work, would become more, not less, important in the future.

For sheer psychological reasons there should not be too much in the way for continued reduction of the French farm labour force. The record of the recent past indicates the contrary. The fact that farm sons (mainly in the smallholding areas) have left agriculture at a more rapid rate than wage workers (most of whom are employed in the prosperous farming regions) also indicates a relatively rational attitude to the remunerative character of farm work.

The distribution of industries across the contry does to some degree run counter to the requirements of exodus from agriculture being combined with balanced regional development. Agricultural exodus to a great extent also means exodus from the areas that traditionally were the most rural ones. A reversal has occurred in the Alpine regions, where many new small-scale industries have succeeded in absorbing part of the population of the dying villages. The south-west, with higher incidence of farm sons remaining and lower percentage of wage workers in agriculture, would seem, together with Bretagne and some parts of central France, to be the areas where industrial decentralisation is desirable as a counterpart to agricultural exodus.

GERMANY

The farm labour force

Complete comparison over time is difficult in Western Germany because of changes in classification. Over the 1950's the compound rate of decrease of male workers in agriculture has been of the order of 3 per cent per year.

Direct comparison between labour force surveys of 1956-57 and 1960-61 shows the following rate of decrease in recent years (Table 1).

Table 1

Germany : Decrease in agricultural labour force
1956-57 to 1960-61
(Data in thousands)

Category	Decrease	Total 1960-61	Rate of decrease in four years (per cent)
Family workers, fully employed	490	2,997	14.3
Family workers, part-employed	288	1,260	19.0
Hired workers, fully employed	218.5	310	41.5
Hired workers, part-employed	244	287	46.0

Source : "Wirtschaft und Statistik", 1962 : 2, page 89.

The hired labour force decreased more rapidly than the family labour force also in the years preceding 1956-57, its number at present is not much more than one-third of what is was at the beginning of the 1950's.

Decline in the number of farm operators and their family members has been considerably slower, as far as can be inferred, also in the preceding years. Family workers other than farm operators are still quite numerous among the younger age strata. Generation pressure therefore appears to be relatively high, at least on the surface of things. This situation is combined with a farm structure where family farms, with little or no hired work force, are by far the dominant feature.

Some recent data on the composition of the German farm work force are shown in Table 2.

Table 2

Germany : Male workers in agriculture, by age and position, 1960

Data in thousands, 000's omitted

Age, years	Farm operators (full- and part-time) (a)	Unpaid family workers (full- and part-time) (b)	Wage workers (full-time only) (c)	Total a+b+c	Total as per cent of all male workers 1960
14-16	.2	23.5	4.0	27.7	10.2
16-18	.2	39.9	11.9	52.0	
18-25	12.6	226.0	55.9	294.5	
25-45	399.6	257.4	78.6	735.6	11.7
45-65	825.7	72.6	71.3	969.6	20.9
65 and over . .	196.4	105.3	5.9	307.6	58.1
Total . . .	1,434.8	724.7	227.7	2,387.2	14.8
Sub-total : 14-65	1,238.4	619.4	221.8	2,079.6	13.3

Source : "Wirtschaft und Statistik", 1963 : 7, page 410, cf. ibid., pp. 404* - 405* (in the annex), cf. also ibid., 1963 : 2, page 87, on "Vollarbeitskräfte".

From this it is evident not only that the generation pressure is relatively high but also that wage workers are still, despite all decline, a somewhat larger fraction of the total in the younger than in the older age strata, and that the majority of all full-time male wage workers are below 45 years of age.

The variation in the agricultural percentage is striking. The high percentage shown in the age group 65 and over must be interpreted to mean that farmers have a significantly different attitude towards retirement than is usual in other groups.

However, the data on family workers include both full-time and part-time workers. Male workers fully employed in agriculture numbered only 1,397 thousand, of which 1,245 thousand wereunder 65 years of age. Short of indications where the part-employed worked the rest of their time (if at all), the figures in the above table may be taken as the more indicative ones. This is confirmed by the data on "Vollarbeitskräfte", on which an evaluation is included in a source mentioned under the table. The total indicated is 2,377 thousand, of which slightly over one-third are male workers.

Income projections

A calculation of production, income and future agricultural population of the type discussed in this report has been made for Western Germany recently and is available mainly in two versions which are essentially identical from our present viewpoint. (1) Projections were made up to 1975 but there are separate estimates also for 1970. Alternative assumptions were made as to the growth of the economy and for prices under the present system of protection versus the prices that are expected to prevail when the E.E.C. common tariff for agricultural products is in full operation.

Up to 1970, the following is assumed. Output would increase more than 20 per cent at present prices (which may be optimistic), but its value would go up only 14 per cent if prices were to drop to the level implied by the common E.E.C. tariff (Plate-Woermann, Table 12, page 94). The prices of external inputs would be almost the same in both cases, which makes considerable difference in net income as between the two assumptions on farm product prices.

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(1) R. Plate and E. Woermann : "Landwirtschaft im Strukturwandel der Volkswirtschaft", Hannover 1962 (Berichte über Landwirtschaft, Sonderheft 14). - Gemeinsames Gutachten von Mitgliedern des Wissenschaftlichen Beirats beim B.M.L. und von wirtschaftswissenschaftlichen Beratern der Kommission der E.W.G., Brussels, June 1962. It is this latter report which is sometimes referred to as "Das Professoren-Gutachten".

The claim of external factors is shown as 44 per cent of output value in 1958-59 at the prices of that year and would rise to 48 per cent under the assumption of these prices continuing, and to more than 50 per cent under the assumption of prices influenced by the E.E.C. common tariff.

Matching these estimates are a set of assumptions on income and the labour force that can have these incomes out of the projected future production (Plate-Woermann, Table 10 and diagram 32, page 55). Under the assumption of more rapid economic growth, which most closely corresponds with the O.E.C.D. growth target, the income expectation of farm people would go up by about 50 per cent up to 1970. This income could be obtained, out of the projected output and expenditure levels, for 77 per cent of the 1958-59 labour force under 1958-59 prices, but for only 65 per cent of the same size of labour force under the price level connected with the E.E.C. common tariff. In 1975, the corresponding percentages would be 69 and 60, respectively.

The E.E.C. version of this projection points out that the major part of the necessary reduction in farm labour force comes from the general economic development that is anticipated, while a much smaller part depends on the price alternatives indicated by the E.E.C. common tariff. The moderate reduction of 23 per cent in connection with present prices depends not only on these prices but also on the rather ambitious projection of increase in output that is envisaged. The same output target is also maintained for the price alternative of the common E.E.C. tariff, which indicates a rising degree of self-sufficiency and only moderate, if any, increases in imports.

With a farm labour force, in 1960, estimated at 2.4 million man-equivalent units (in this case composed of 2/3 men and 1/3 women - an unusual proportion, related to war losses among the now middle-aged or older strata) a reduction by 23 or 33 per cent would mean a decline by about 550 thousand or 850 thousand units, to 1.85 or 1.55 million units. The transfer would amount to about 2 or 3 per cent, respectively, of the entire labour force of the Federal Republic, thus being of modest proportions as a contribution to the labour force of other sectors. Most of the reduction, in this case, will have to be among the workers classified as farm operators and their family members ; the entire remaining hired work force is only a fraction of the decrease we are discussing.

The need for labour

The existing labour force, in man-year equivalents, can be confronted with an estimated labour requirement, separately for each size class of farms in the latest agricultural census (Table 3).

Table 3

Germany : Labour available and needed, by size of farm, in 1960
(Data in thousands of man-units ; 000' omitted)

Size of farm, ha	Labour available	Labour needed
0.5-2	317	80
2-5	423	170
5-10.	555	300
10-20	607	450
20-50	353	350
50 and over	123	125
Total	2,377	1,475

Sources : Labour available from "Wirtschaft und Statistik" 1963 : 2, pp. 87 sqq., 70° (in the annex section called "Statistische Monatszahlen"), labour needed computed from data derived from the 1960 Census of agriculture as published in "Statistisches Jahrbuch" 1962. At first labour norms were applied which had been adequate around 1950 but are now outdated, the much too high total was thereafter revised by using alternative assumptions on the degree of reduction in labour requirements in crop farming and animal husbandry, by means of equations to show which combination of such assumptions would best fit the situation in the larger farms, those where hired labour still plays a sizeable role.

The volume of effective employment shown in the table is smaller, by about 900 thousand units, than would have been required around 1950 to produce the same crops and animal products. Reduction in labour requirements has thus kept pace with the reduction in farm labour, and the relative size of the labour surplus is, if anything, slightly larger than before.

The perspective of further increasing the efficiency of labour is similar to that in the Netherlands and France : it will be a question mainly of raising the efficiency in animal husbandry. On small holdings, there is certainly also a backlog in efficiency in crop farming, but that has been discounted in the estimate above (the "labour needed" assumes the same efficiency on all farm sizes, hence the size of the surplus). To what extent this backlog can be tackled depends to a large extent on the development of the farm size structure. In animal husbandry, the German labour norms are still relatively high. Given the necessary changes in farm structure and the necessary investment in buildings, there should not be any decisive difficulty to do the work needed both for present and for anticipated future production with a labour force very much smaller than the present one - perhaps more so than the calculations generally set forth in this report appear to necessitate.

Obstacles to removing the labour surplus

As already indicated, a primary obstacle lies in the farm structure and the present composition of the farm labour force. More than at any time in the past, German farms are family farms, and a large part of the labour force is tied down in a situation which many German farmers regard as basically desirable, if only there were favourable prices for their products. A testimony of this desire to remain in farming is in the prices paid for farmland which have been driven very high in recent years, among other things because farmers who gave up their land for urban, industrial or mining developments, freely spent the compensations they received in order to secure a new farm irrespective of cost.

Aside from this obstacle in the combination of farm size structure and rural psychology, there is also the more objective hindrance in certain areas which are located far away from job opportunities outside agriculture. On the whole, this obstacle should be less salient in Germany than in some other countries ; but then again it is partly psychological, being tied also to the idea of "neighbourhood", and how far a city in another part of the country is regarded as a strange place. Bavaria should be the main case in point ; otherwise the areas that are far from industrial cities also tend to be those where the agricultural population is less dense than it is (or has been) in the most industrialised regions.

Land tenure goes hand in hand with farm structure as a retarding factor. The fact that most farm land is owned by the operators makes it all the more difficult to create larger holdings by renting in additional land. Farm fragmentation is also a structure problem which has been offered only piecemeal solutions.

The country would need to formulate a farm structure policy that went beyond the immediate future. Measures taken in the past (including the recent past) have usually aimed at strengthening farms of a type and size which were believed to be adequate then and there, rather than remaining viable for a long time ahead. The intensive character of animal husbandry in most parts of the country makes it so much more necessary to avoid misdirected investments in farmsteads that cannot at length remain independent units of operation.

ITALY

The agricultural labour force

After many decades of a more or less static labour force situation, a tendency of decrease began to appear to some extent in the 1951 census of population. Since the turn of the century, and still in the 1930's, male workers in Italian agriculture had counted about 6 1/2 million. In 1951, the number was still above 6 million. The recent decrease, which has brought the number down to not much more than 4 million (1) is known mainly through quarterly labour-force surveys which are available since 1954. They are based on a rather small sample and do not allow for all the detailed analysis that might be made on the basis of a census of population.

For convenience we choose the labour force data from 1961 (the year of the census). Table 1 shows the distribution of male agricultural workers by age and their percentage of total male labour force.

The inclusion of workers aged 10-14 does not have great importance, since the numbers involved are known to be small. Agriculture, as usual, has a larger share in this stratum of reportedly active persons than is the case among young adults.

More important for the analysis is the choice of age brackets at 30 and 50 years, which may conceal some of the contrasts with regard to the percentage of agriculture in the total. In the group 30-50, it stands to reason that the sub-group 40-50 should have a higher agricultural percentage than the sub-group 30-40, this follows already from the contrast against the percentage in the group 50-65. If this is correct, then the agricultural percentage in the sub-group 30-40 is lower than 24. Also in the preceding group, 10-30, a

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(1) Cf. R. Lenzi : "Nuove tendenze sul mercato di lavoro italiano", in "Statistica" (Bologna) 1960, pp. 539-558.

Table 1

Italy : Male labour force, by age, 1961
(Data in thousands, 000's omitted)

Age groups (years)	Total	Agricultural	Agricultural as % of total
10-30	4,570	1,102	24.1
30-50	6,484	1,553	23.9
50-65	3,138	1,177	37.5
65 and over	483	293	60.7
Total	14,675	4,125	28.1
Sub-total, under 65.	14,192	3,832	27.0

Source : Annuario di statistiche del lavoro e dell emigrazione, Vol. 3, 1961.

reverse contrast can be surmised. Teenage workers are normally employed in agriculture to a higher percentage than is the case with young adults - they are the children of the middle-aged and do not yet migrate on their own to the extent as the young adults. From this we conclude that also the age stratum 20-30 should have an agricultural percentage below 24, maybe not much above 20.

The labour force data thus allow to conclude that the age strata of the young adults - say, between 20 and 35 years of age - have an agricultural percentage which is not much above 20. These are the age strata which are most likely to determine the relative position of the agricultural population in the future. By natural movement alone, this percentage would become prevalent within 20-25 years from the date of the figures. Up to 1970, the general percentage of agriculture might well fall to around 25 even without any further exodus.

The agricultural percentage is very unevenly distributed across the country. Using data for all ages (and thus comparable with the 28.1 per cent shown for all ages in Table 1), the agricultural percentage is less than 20 in parts of northern Italy (only 14 per cent in Lombardia). It is close to the general average in the Tre Venezie and in the south-central provinces around Rome and Naples. It is substantially above average in the Emilia-Romagna-Marche area and even higher (around 40) in the most southerly parts of the mainland and on the islands (Sicily and Sardinia).

The role of female labour has been increasing as a consequence of more or less temporary absence of many men seeking jobs elsewhere. It is difficult to explore on the basis of the labour force data because, in the breakdown by industry, there is no link to the data on total population. It can be shown, however, that the proportion of women reported as working is sharply below average on the islands and also in Lombardia. The proportion is considerably above average on the southern part of the mainland.

The distribution of both male and female agricultural workers on main types of position within the industry is shown in Table 2.

Table 2

Italy : Distribution of male and female agricultural workers by type of position, in 1961
(Data in thousands, 000's omitted)

Type of position	Male	Female	Total
Managers and employers . .	29	3	32
Hired workers.	1,256	452	1,708
Unpaid family workers . . .	931	1,054	1,985
Self-employed (a)	1,909	273	2,182
Total.	4,125	1,782	5,907

(a) Figures inferred (by subtraction of the other categories from the total).

Source : See Table 1.

The distribution shown in Table 2 gains in interest when it is also studied by age, as shown in Table 3 for male workers.

Table 3

Italy : Male workers in agriculture by age and by type of position, 1961

(Data in thousands, 000's omitted)

Age groups (years)	Employers	Hired workers	Unpaid family workers	Self-employed (a)	Total
10-30	3	364	618	117	1,102
30-50	13	558	262	720	1,553
50-65	11	305	41	820	1,177
65 and over . . .	2	29	10	252	293
Total	29	1,256	931	1,909	4,125
Sub-total : under 65.	27	1,227	921	1,657	3,832

(a) Figures inferred (by subtraction of the other categories from the total).

Source : See Table 1.

The age distribution of hired farm workers reveals nothing very startling ; there still are substantial numbers below age 30. That of farm holders (own-account workers, self-employed persons) versus unpaid family workers is also not very extraordinary, but it places in evidence that Italy, no less than several other countries, has a large number of farmers likely to retire or die in the near future. In addition, the data also show that, in spite of the very large recent exodus of young people from Italian agriculture, the younger strata consist principally of persons who are not, or not yet, farm operators on their own.

This lends considerable interest to a recent inquiry among farm youth geared at exploring their intentions for the future as well as the likelihood that they will put their intentions into effect. (1)

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(1) "La gioventù contadina di fronte ad una agricolture moderna e progredista. Inchiesta 1960". Rome, Confederazione Nazionale Coltivatori Diretti (no date).

The questionnaire for this inquiry was answered by some 27,000 young men occupied in agriculture and scattered all over the country, most of them were between 20 and 35 years of age. They do not make a statistical sample in the sense that the results could be raised to represent all the young men in Italy's agriculture, but their response is considered fairly indicative of the outlook among large segments of the same age strata of farm people. It is then of interest to note that about half of these young men said that they had decided to seek another profession, at least as long as matters stood in agriculture as they do now. In varying proportions they also reflected on what they would do if the conditions were different from those they knew. The material is of interest also for the information it gives on the degree of schooling and literacy, the degree of mechanisation existing on the farms concerned, the presence of skills usable outside of agriculture, and various socio-cultural drawbacks and advantages of remaining in agriculture, as these factors were felt by and accounted for by the respondents. The remaining impression from this inquiry is one of farm youth in ferment, reacting to a rising level of insight into their own condition and to the fact that they begin to see a brighter future for themselves outsides of agriculture which many of them associate in their minds with traditional poverty. The material indicates that, for reasons of skill, awareness of alternatives, and discontent with present conditions, there is no reason why we should not expect about half of the generation which is now between 20 and 35 years of age to leave agriculture within the medium-term future, and for this to be followed up by a corresponding exodus of the strata that are now in their teens or younger. Such a development could reduce the share of agriculture in Italian population and labour force to 10 per cent over the next 20-25 years and probably down to 15 per cent or a little more by 1970.

Income projections

A recent inquiry into the growth of the Italian economy and its projected growth until the early or mid-1970's is available in two versions. (1) It is shown how the rate of growth in the Italian economy in the 1950's is due principally to the high rate of expansion in industries and tertiary activities. Growth of agricultural production was 2 1/2 per cent per year in gross terms but, as a result of increasing external costs and deteriorating terms of trade, the increase in value added in agriculture was no more than 1 per cent per year. Over a decade past, per caput income in agriculture rose less than the national average ; the opposite has held over the last few years, as a result of rapid exodus from agriculture.

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(1) "Rapporto del Presidente della sezione esperti della Commissione nazionale per la programmazione nazionale economica (Ministerio del Bilancio) Rome", June 1963 (Preface signed : Pasquale Saraceno). - P. Saraceno : "L'Italia verso la piena occupazione," Milano (SVIMEZ) 1963. Cf. also M. Pagella : "Osservazioni sullo sviluppo del agricoltura italiana nel periodo 1949-1960", in "Rivista di economia agraria" 1962 : 3, pp. 67 sqq.

Although there is a considerable disparity between incomes in agriculture and in the other sectors or in the country as a whole, this depends in part on the general disparities between regions, the low-income areas being also those with high percentages of agricultural population. Within each region, the disparity is usually smaller and in some areas further mitigated by the presence of dual employment as a source of additional earnings for farmers. The latter is true especially in some of the more highly industrialised regions of the north.

However, the projections show that even in the medium-term future everything points to a much higher rate of growth in the other sectors than in agriculture. This in spite of the fact that some branches of agricultural production, with higher demand elasticities and/or better export prospects than the average, are expanding at rates coming close to those of the factory industries. Up to the mid-seventies, agricultural production is projected to continue to grow at about 2 1/2 per cent per year (gross), which would yield a rate of growth of value added of 1.9 per cent at constant prices. At the same time, the general rate of growth of the GDP is projected at 4 1/2 per cent per year. As a result, agriculture's share in national income would go down from 16 per cent (1961) to 11 per cent (1975-76). Allowing also for variation in relative prices on the pattern of the past, agriculture's share in national income at current prices could come down to 10 per cent in 1975-76, with a net incremental ratio of only 1 per cent as in the recent past.

In order for agriculture to maintain the same rate of growth in per caput income as the rest of the economy (and possibly to exceed it slightly), it is calculated that the agricultural labour force ought to go down from 6 million (both sexes, all ages) in 1961 to 4 million in 1975-76, or from 30 to 18 per cent of the total, thus at a rate of 2.7 per cent per year. Up to 1971, over 10 years, this would mean a 25 per cent reduction, to 4 1/2 million workers (both sexes, all ages), or to some 2.9 million male workers aged 15-65.

In this whole analysis, emphasis has been on the need for recruiting workers to other branches of the economy as much as on the desirability of a reduction in the agricultural population. A good part of the rapid growth rate in the recent past is attributed to the rate at which the labour force could be expanded in the high-productive industries and services, by providing employment to workers previously under-employed, including those leaving agriculture. For the same reason, the projection reckons with a gradually slower rate of expansion in the economy at large, as the sources of additional labour are being more completely tapped.

This invites the question whether a 25 per cent reduction in the agricultural labour force is all that can be expected over 10 years to come.

The requirement for labour in agriculture

In the past the farm labour situation in Italy, as in other Mediterranean countries, has been one of chronic under-employment. The question was not so much about the need for labour in agriculture as rather on how many people could be accommodated in agriculture and given some employment and livelihood there even though they were not needed strictly speaking. This whole situation is beginning to fade and interest is now more and more focused upon the same problem as north of the Alps : how large a labour force will it be necessary to retain in agriculture to maintain production ?

Work norms for crops and livestock have long been in use in Italy. The variety of conditions withing the country is such that a large number of different norms were and are used for provinces and for zones of altitude (mountain, hills, plains) within these. Based on pre-war norms, two independent estimates, referring to conditions as around 1950, found under-employment in the technical sense to be of the magnitude of one-third (or somewhat more) of the total work force available to agriculture. (1)

Since that time, the labour force in Italian agriculture has been reduced by about one-third. It is obvious, then that overall efficiency has risen considerably, since there is consensus to the effect that much under-employment continues, also in the technical sense. This is as could be expected from the increases in agricultural machinery and other modern means of production. It is confirmed by some recently released work norms for individual crops in specified areas, and also by recent overall calculations of the present requirement for labour in Italian agriculture. The former are shown in Table 4.

Recent indications, received from SVIMEZ, show in fact that the degree of technical under-employment is still of the order of one-third of the labour force in agriculture. More than half of this is classified as "hidden", while the amount classified as capable of being removed without changes in the productive system is only about 10 per cent of the labour force.

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(1) "Indagine sulla stagionalità del lavoro e sul grado di impiego dei lavoratori in agricoltura", Rome (INEA - Camera dei Deputati) 1953, pp. 18 sq ; - F. Dovring : "Land and labour in Europe", The Hague 1956, 2 ed. 1960, page 86.

Table 4

Italy : Labour requirements, selected enterprises and areas, in 1962 and at a previous date
(In hours per hectares or animal)

Enterprise	Area	1938	1951	1962
Wheat	Apulia (plain)	290	. .	60
Rice.	Lombardia	900	. .	120
Milk cow (including feed production).	Lombardia	5,500	. .	2,500
Apples.	Ferrara	. .	1,784	1,320
Pears	Ferrara	. .	1,896	1,560
Peaches	Ferrara	. .	1,768	1,344

Source : Annuario dell' agricoltura italiana, 1962 (data obtained in advance of publication, courtesy Istituto Nazionale di economia agraria).

Reduction in agricultural work force of the order anticipated in the Saraceno reports will thus require a combination of rising efficiency and structural change to come true. A fortiori, this holds even more if the rate of exodus does in fact exceed the projection, as it very well may.

Field crop labour represented half of the volume of jobs in Italian agriculture around 1950. Despite the advances of mechanisation, much remains to be done before field crop production can be said to have reached any kind of definitive peak level of efficiency. Tractors are numerous but not always used in the most efficient way. Most of the grain crops are still not combine harvested. Mechanised equipment for cultivation and harvesting of root crops (e.g. sugar beets) has not gained currency in Italy.

Animal husbandry looms less large in the total picture of labour requirements in Italy than in central Europe, but tree crops are a major sector which will raise particular problems of increasing efficiency. Abandoning low-productive vineyards already stands as one possible and likely avenue towards improvement. Experiments are going on with regard to mechanical harvesting of certain tree crops such as olives, (1) which alone accounted for 4 - 5 per cent of the total work load under the old norms of 35 - 40 days per hectare (which is similar to the level reported from Greece and Portugal). Under modern systems, direct labour for harvest can be reduced to 16 per cent (of the old norms) for table olives and to 10 per cent for olives for oil production ; in both cases, total cost of harvesting was reduced to 1/3 or less of the costs for manual harvesting. Even though such results will come into full fruition only over a prolonged period of adjustment, they clearly indicate by their scope that Mediterranean agriculture is not as inaccessible to technical rationalisation as has often been believed.

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(1) G.C. Mott : "Il problema della raccolta meccanica delle olive", in "Rivista di economia agraria", 1962 : 4, pp. 138 sqq.

In view of these observations, there is no reason why a further reduction of the moderate scope indicated by the Saraceno reports should not be compatible with future labour requirements ; it may well be argued that even considerably larger reductions in the labour force would be possible form this viewpoint.

Structural features

The preceding should have shown that there is a large scope for reduction of the agricultural population and labour force in Italy. The recent trend of exodus, which has exceeded that projected by the Saraceno reports for the future, indicates that the main problem does not lie in any unwillingness of the young people to leave agriculture. The 1960 inquiry on young farm people, as quoted above, underlines this further, as does also the still considerable number of farm wage workers. When concern is often expressed about the viability of the Italian farm industry in the future, it is because rapid changes seem to be detrimental in relation to an agrarian structure which is not well prepared to receive such changes. Farm size structure, land layout, and the patterns of mechanisation and labour organisation would have to be modernised rapidly, and also the patterns of production will have to be changed in many ways.

A somewhat clear picture of the Italian land system has been lacking until recently, when the first results from the 1961 Census of Agriculture were published. (1) Since these results have not yet been widely discussed, a brief presentation of the Italian farm structure may be in order here. The distribution of farms and farm area by size of farms is shown in Tables 5a and 5b, in a simplified version of the farm size classification scheme (the census report uses 33 size classes), and with separate breakdown for the three "altitude zones" - mountains, hilly areas, and plains.

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(1) "1° Censimento Generale dell' Agricoltura, 15 aprile 1961". Vol. 2 : "Dati provinciali su alcune principali caratteristiche strutturali delle aziende. Appendice. Dati riassuntivi nazionali". Rome, Istituto Centrale di Statistica, 1963.

Table 5a

Italy : Number of farms, by size of farm, in total and by three altitude zones

(Data in thousands, 000's omitted)

Size of farm, ha	Total	Mountains	Hills	Plains
Under 1	1,401	316	684	401
1 - 5	1,864	500	897	467
5 - 10	561	150	265	146
10 - 20	288	73	135	80
20 - 50	117	31	53	33
50 - 100	28	7	13	8
100 - 200	12	3	6	3
200 - 500	5	2	2	1
500 and over	3	2	1	0.2
Total	4,279	1,084	2,056	1,139

Source : 1961 census of agriculture

In addition to the farms shown in Table 5a, there were also about 15 thousand farms without any agricultural land which were not distributed by altitude zones and therefore not included in the table above.

At first sight, the figures seem to confirm the traditional opinion of Italy as a country with many large estates. A graphic presentation also reflects a relatively "aristocratic" distribution, i.e. one with a low degree of distributive equity, this in contrast to most countries and areas in western Europe north of the Alps.

At the same time as this is true about the relative distribution of farm holdings, the distribution by altitude zones makes clear that the presence of some very large farms is more apparent than real. Most of the land in very large holdings is in the mountain areas, where obviously the unit value of farm land is low. On the plains, which have on the whole the highest unit values of land and include a far larger part of the productive capacity of the country than indicated by their share in total farm acreage, farms over 100 hectares in size occupy only 15 per cent of the total farm acreage. The hilly areas, which are intermediate in character and have nearly half the unweighted farm area of the country, show 22 per cent in

Table 5b

Italy : Farm area, by size of farm, total and by three altitude zones
(Data in thousand hectares; 000's omitted)

Size of farm, ha	Total	Mountains	Hills	Plains
Under 1	710	203	346	204
1 - 5	4,701	1,285	2,266	1,150
5 - 10	3,976	1,054	1,888	1,034
10 - 20	4,009	1,015	1,882	1,112
20 - 50	3,493	922	1,591	980
50 - 100	1,944	500	899	545
100 - 200	1,615	437	763	415
200 - 500	1,739	731	718	290
500 and over	4,385	3,099	1,045	241
Total	26,572	9,203	11,398	5,971

Source : 1961 Census of Agriculture.

farms over 100 hectares, while the same percentage is 29 in the mountain areas. It can easily be surmised that also in the hill and plain areas, it is often the less productive land that is included in the largest farms, and vice versa. The real degree of "distributive equity" is therefore very poorly expressed in farm sizes in unweighted area in a country as varied as Italy.

Among farms below 100 hectares in size, the distribution of both farm numbers and farm area is essentially similar in the three altitude zones.

Considering the rapid economic advancement going on in Italy, it is quite possible that the distributive function will change in the near future. No attempt was made, therefore, to extrapolate the future distribution by size. As the census gives no information on labour force, a farm-size check of the efficiency levels is not feasible.

It is interesting in this connection to discuss the farm structure from the viewpoint of how well it might lend itself to the kind of changes in labour supply and farming systems that are likely to occur.

The census enumerated a total of 4.3 million farms. Since the labour force surveys for 1961 returned employers and self-employed persons only to the extent of a little over 2.2 million (both sexes, all ages), a large part of the holdings included in the census should not be considered as farms. Most of those under 1 hectare, and a large part of those between 1 and 5 hectares are not held by individuals classified in the labour force data as operators.

It may be noted also that the number of "employers and managers" in the census is more than the number of farms over 100 hectares but less than the number of farms over 50 hectares. It is interesting to see also that a very large part of all the farm area is in holdings between 5 and 20 hectares, on the plains, this proportion is over half, in the hilly areas nearly half. A similar proportion would no doubt emerge in the mountain areas if extensive highland pasture holdings were kept apart.

From another table in the census reports one can also see the number of holdings, and their area, on which wage workers are used to a significant extent. These number about 230 thousand farms and cover more than 9 million hectares - but this includes a large part of the extensive highland holdings. Not all of these holdings use wage workers, some of them are used through "compartecipanti", a kind of sharecroppers or share-wage workers.

From all of this it appears that basically the Italian farm structure is not so different from the family farm structures in Western Europe. The bulk of the land resources is in holdings which either are family sized or may become family operations when the hired labour force is sufficiently reduced, and the majority of these small to medium-sized farms do not use any hired labour.

The adjustment problems to more capital intensive agriculture thus have great resemblance to those of the other West European countries. The advantages of larger farm size which have played a part in England up to now are less in evidence. On the other hand it may be argued that the tenure structure, which includes large areas under lease, sharecropping or arrangements with "compartecipanti" (and this is especially true on the plain areas, those where the productivity per hectare is on the whole highest) will be somewhat more favourable to a regrouping of holdings. Rented holdings have been protected by law against termination of the contract on the part of the landlord. But to the extent that renters and sharecroppers leave the land to seek other occupations, the landowners will have a freer hand in regrouping the land to more economic units.

Another difficulty which may look larger in the static picture than under the spectre of rapid changes is fragmentation. The census does not reveal fully how serious this problem is in some quarters, because the average numbers of parcels per holding are low, in the plain areas, for instance, about half of all the holdings are in one piece of land. The real size of the fragmentation problem can be gauged only from village studies, showing the degree of entanglement of holdings, some of which may be moderately fragmented but get the problem complicated by inter-mixture with more fragmented neighbours. At any rate, the census of agriculture shows that the degree of fragmentation is highest in the mountain areas, less so in the hilly areas and least pronounced on the plains. In other words, the worst fragmented areas are also those in which certain land areas will revert from arable use to pasture or forest, and also in areas in which the contraction of the farm numbers should be particularly marked in years to come. All of this does not prevent, of course, that fragmentation does play a role in retarding and complicating the advances of mechanised agriculture.

A difficulty which has been pointed to as a reason why farms have not yet begun to be re-allocated into larger units on any significant scale is in the absence of a land market. In the words of Giuseppe Medici, "land can be bought, it cannot be sold". Many small holdings are continuing a formally independent existance mainly through the work of women and children, after the adult men have left to seek work elsewhere. Obviously this is a transitional stage. Sooner or later many of these farms will come on a land market in one way or another. A general scheme for the orderly transfer of land into larger holdings, similar to those discussed in some other countries, would be an important point on a constructive land policy. This remains true whether the leading objective is to preserve and consolidate the structure of family-sized farms or some other scheme for size and type of farms.

THE NETHERLANDS

The farm labour problems in the Netherlands differ from those in most European O.E.C.D. countries. High birthrates and large family sizes led previously to continued increase, if at a slow rate, of the agricultural population, up until the late 1940's. High density of people on the land was accompanied by a high and rapidly rising productivity despite the high inputs of labour per unit of area and livestock. Since around 1950, the agricultural labour force has been going down rapidly. The actual number of people leaving agricultural households (that is, including young people making their first choice of career) to seek a livelihood in other sectors of the economy, has exceeded the actual reduction in farm labour force to a higher degree than in most other countries under review. Continued increase in national income, and uncertain prospects for export expansion, lead to the expectation of a continued rapid outflow. Knowledge of further possible gains in productivity draw in the same direction. The main obstacles to attaining the level of efficiency which should go together with such a development lie in the size structure of farms and the layout of farm land.

The farm labour force

Total male labour force having its main occupation in agriculture was well over half a million in 1947 (the peak year, as far as our information goes) and fell by about 30 per cent of this figure up to 1960, a rate of decrease of around 3 per cent per year. The rate was somewhat slower in the early 1950's and has been particularly rapid in the late part of the same decade, when it averaged 3 1/2 to 4 per cent per year (compound rate, counting the reduction in a given year as per cent of the number at the beginning of the year).

Data on male workers aged 15-65 are less complete but indicate more or less the same magnitude and trend of decrease. The same conclusions are also borne out by data on "labour year units" ("arbeidsjaareenheden", AJE). The latter are evaluations of the total real input of labour in agriculture, weighting all categories of workers into a standard unit. The AJE data represent about 120 to 130 per cent of the number of male workers aged 15-65. The AJE declined from 587 thousand in 1950 to 431 thousand in 1960, that is also by close to 3 per cent per year. Selected data are shown in Table 1.

Table 1

Netherlands : Agricultural labour force
(thousands, 000's omitted)

Year	Male workers all ages	Male workers ages under 65	AJE
1947	533	490	...
1950	..	..	587
1956	431	388	469
1959	396	350	442
1960	373	330	431

Sources : Census of population 1947, census of agriculture 1950, 1960, Landbouwcijfers 1961, A. Maris in"Landbouw en platteland in een stroomversnelling"(Haarlem 1963), page 16.

The number of workers who actually left agriculture (either by abandoning an agricultural occupation or by not taking up one although reared in a farm household) can be estimated, if crudely, from the age distribution shown in the 1947 census and a projection of the numbers which would have been present around 1960 if there had been no exodus in the meantime. This invisible or implied exodus (which did of course also go on before 1947) amounts to about 100 thousand males in the years 1947-60. Total real exodus in the years under review is thus of the order of one-quarter million men, or about two-thirds as many as were still working in Dutch agriculture in 1960.

The composition of the farm labour force has also changed with regard to position within the industry. Hired male workers declined from 185 1/2 thousand (35 per cent of total male workers) in 1947 to 105 thousand (27 per cent) in 1960, a decline of 43 per cent of the number in 1947, or at a rate of 4 1/2 per cent per year. Family workers (operators and unpaid family members) increased in relative terms from 64 to 73 per cent of the total, and their decline in absolute terms was only from 347 thousand in 1947 to 268 thousand in 1960, which means a decline by 23 per cent of the number in 1947, or an annual rate of 2.4 per cent. This again is differentiated as a strong reduction of unpaid family workers and little change in the number of farm operators.

This difference in the rate of outflow, which has its obvious explanation, and the changed proportions which result from it, places the focus of the problem of the future at the farm operator labour force. Hired workers will obviously continue to be released as the larger farms become more mechanised and also as the wage alternatives of the hired workers in other industries become more attractive.

The problem of farm operators is somewhat less tractable. From statistical sources alone, it is customary to compute what is called the "generation pressure" as a proportion between the number of farm operators and young men waiting to take over a farm. (1) A general consideration of the age structure of the Dutch farm population indicates at any rate that a previously relatively high generation pressure has recently been revised into a much lower one. Continuing large family size implies, among other things, that the farm families now have their aliquot share of young children in the country. If there were no further outflow, the force of male workers belonging to households where the head is farm operator or horticulturist would increase by 40 to 50 thousand over the next ten years, or by about 15 per cent. (2) This number thus represents a minimum exodus of young people (whether leaving an agricultural occupation or never entering one) that would be necessary to maintain the same number of people and farming opportunities as in 1960. When the latter go down, even more young people need of course leave.

Studies directed towards estimating in advance the rate of outflow that should be anticipated indicate that a substantial but rather moderate exodus is to be expected. One such inquiry was based on interviews of young farm people to explore their intentions. (1) The key question was about the number of farmers' sons who had already made up their minds to become farmers. The conclusion was that the total reduction in the Dutch farm labour force, up to 1972, would be between 61 and 82 thousand, or only 15-20 per cent of the number in 1960.

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(1) On the concept and computation of generation pressure, see A. Maris, C.D. Scheer and M. Visser : "Het kleineboerenvraagstuk op de zandgronden", Assen 1951, page 135. Cf. also A. Maris and R. Rijneveld : "Bedrijfsopvolging en beroepskeuze in land - en toinbouw", The Hague 1959, page 86 sqq.

(2) Conclusion based on age distribution shown in "Landbouwtelling 1960", Vol. 2, page 22.

Another prognosis was made recently for the five years 1960-65, based mainly on extrapolation of past trends in combination with detailed analyses of the composition of the farm labour force in 1960. (2) The main source of demographic data was the population census of 1960. According to the results of this inquiry, it would be reasonable to expect that the male agricultural labour force would go down by about 14 per cent in these five years. If it were permissible to extrapolate further for another five years, this would mean an overall decrease of about 26 per cent of the whole male labour force in agriculture, leaving some 283 thousand in 1970, or a reduction by about 100 thousand units. Together with the "implied" exodus (see above) this would mean some 150 thousand male workers added to the non-agricultural labour force from agricultural families. The numbers are smaller, both absolutely and even more so when compared with the total non-agricultural labour force, than in the preceding decade.

If also the trend towards more rapid exodus of hired workers were to continue, then their exodus over the ten years would remove 40 per cent of their number in 1960, which was about 105 thousand.

Extrapolation of past trends, in a case like this, may tend to understate the movement. Among other things, the fact that the exodus implies smaller and smaller numbers, both absolutely and in relation to the size of the non-agricultural labour force, makes it likely that the trend of exodus from agriculture may become somewhat accelerated, given continued conditions of shortage of labour in other sectors of the economy. In the following, we will discuss the implications from a reduction in agricultural labour force by 30 per cent of the number in 1960.

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(1) D.B. Baris and R. Rijneveld : "De mogelijkheden tot vermindering van de agrarische beroepsbevolking", in "Economisch-statistische berichten", 45, 30th November, 1960, No. 2263, pp. 1144-1146.

(2) "Onderzoek naar de ontwikkeling van de agrarische werkgelegenheid in een aantal gebieden in Nederland", mimeogr. received from the Landbouw-Economisch Instituut, 1963.

Income projections

No comprehensive national study seems to exist of the incidence of income changes upon farm income and farm employment. In the present context, some general remarks on national income and agricultural production will have to suffice.

Dutch national income rose somewhat more rapidly than in the O.E.C.D. group as a whole in 1950-60, and somewhat more slowly in 1961-62. A recent published forecast by the E.E.C. indicates growth (1960-70) of the Dutch G.D.P. at 4.15 - 4.6 per cent per year in the aggregate, or by 3 - 3 1/2 per cent per caput. (1) It is therefore not very extreme to assume that the country will fall in line with the general target for the O.E.C.D. group of 50 per cent growth 1960-70.

The share of agriculture in national income was about 10 per cent before the war, then rose to 12 per cent in the early nineteen-fifties and again fell to around 10 per cent in 1960. The considerable exodus that has taken place should thus have led to an improvement in the parity ratio of Dutch farm people, provided the "leaks" in taxation and payment of rents and interests have not increased in any extraordinary manner.

Population increase is faster than in most European countries but not quite as rapid as in North America. For the near future, it may be assumed to come close to the general average for the O.E.C.D. group as a whole, or possibly slightly above.

Personal incomes are sufficiently high, and the food consumption standards in the country also, for total domestic demand for food to grow only slightly (if at all) in excess of the rate of population growth. The prospects for export expansion are judged as uncertain. The best ones are in high-quality horticultural products, but they are not the bulk of all agricultural output in the country.

The Dutch situation is thus close to those for the O.E.C.D. group as a whole. Possibly the rate of increased capital intensity per worker necessary to raise per caput incomes in agriculture will be on the high side in the Netherlands, having in mind the level of intensity already applied. General indications thus point to a decrease in the agricultural population of at least 20 per cent in a decade, if the disparity ratio is to be kept where it was in 1960. The likelihood of a continued decline in agricultural prices relative to other prices would sharpen the conclusion. A 25 to 30 per cent decrease of the agricultural population in 10 years is in no way an unreasonable assumption.

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(1) "Les perspectives de développement économique dans la C.E.E. de 1960 à 1970", Rapport d'un groupe d'experts, Brussels 1962, page 74.

Labour requirements

The Netherlands is one of the classical countries for measuring the efficiency of farm labour and setting standards for reasonable efficiency, given certain general conditions of production patterns, equipment, etc. The Dutch system of "standard hours" and "labour force units" have served practical purposes and served them well.

The system of agricultural censuses in the country renders possible to apply the farm size check to test the realism of labour norms in a general way. In a previous inquiry, calculations have been made, based on the 1950 census of agriculture. (1) These were based on Dutch and Belgian norms of labour efficiency from about that time. More recent norms, up-to-date for 1960, which were received from the Landbouw-Economisch Instituut for this inquiry, were tested on the 1960 census of agriculture and were found to check out well. Results from both computations, 1950 and 1959, are shown in Table 2. Not only are both series consistent by showing approximately the same number of man-years available and needed in the larger size classes of farms. They also agree in showing that the very largest farms have an apparent small surplus of manpower (which is not entirely surprising), and that there is a certain surplus of labour also in the size-group of 10-20 hectares (supposedly in the main localised to the lower part, 10-15 hectares).

The results from the two computations are also in agreement in showing the "labour surplus" to be close to 30 per cent at both points in time. As unit yields have risen in the meantime, the output per man has of course risen correspondingly.

For 1959, the calculation was also made separately for one of the agricultural regions in the country, the sandy-soils areas, which have nearly half of the agriculture of the country. By subtraction, a table was also produced for the rest of the country (including five other agricultural regions). These partial tables check out well with regard to labour use in the higher size groups. They also show that the surplus of manpower is relatively larger in the sandy-soils areas than in the rest of the country. The percentage of computed surplus is roughly 35 per cent in the sandy-soils areas and 25 per cent in the rest of the country.

These conclusions cannot be made specific with regard to the horticultural areas or the specialised horticultural holdings, for which not enough information was received. The horticultural areas have less than one-tenth of the agricultural manpower in the country.

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(1) F. Dovring : "Land and Labour in Europe 1900-1950", The Hague 1956, 2 ed. 1960, pp. 121, 406 sq.

Table 2

Netherlands : Labour available and required, by size of farm, 1950 and 1959

(Data in thousand man-years, 000's omitted)

Size of farm, ha	AJE 1950		AJE 1960	
	Available	Required	Available	Required
0 -5	194	79	131	47
5 -10	133	92	99	67
10-20	134	118	109	97
20-30	57	59	43	44
30-50	47	46	34	33
50 and over	22	20	15	13
Sub-total : under 10.	327	171	230	114
10 and over	260	243	201	187
Total	587	414	431	301

Sources : Computations based on the agricultural censuses of 1950 and 1960, and labour norms for these two points in time.

The rate of labour surplus was thus close to 30 per cent in the country as a whole both in 1950 and 1960. Between the two censuses, the agricultural labour force was reduced by somewhere near 30 per cent. The farm labour force available in 1959 is only slightly above that required in 1950. But the exodus has not removed the surplus, only reduced it in absolute size. In relative terms, it is about as large as before. This conclusion is consistent with the fact that most of the labour surplus is on under-sized family farms. Exodus from agriculture was most marked among hired workers who were mainly employed on the larger farms ; these farms were made correspondingly more efficient in the process, but many of the small farms became increasingly inefficient in comparison with the raised efficiency level of the larger ones.

A continued decrease in the labour force, say by 30 per cent in the decade 1960-70, is likely to have a similar incidence : increased efficiency on the present labour-hire farms, some decline in the number of family farms, and continued surplus of manpower on remaining under-sized family farms, including some that were full-sized in 1960, before the level of mechanisation and efficiency rose even further.

The question whether a further reduction by 30 per cent is feasible, and whether it may be possible within the decade 1960-70, requires some discussion of the labour norms of 1960, those which check out well in the situation of the larger farms at that time.

It is necessary, in this connection, to differentiate between three groups of work norms : for field crops, for horticultural crops, and for livestock. As the information on horticultural crops is insufficient, we leave them out for the present ; we way assume that they will remain unchanged,or change very little, it may also be that future gains in efficiency in these lines of production will be offset against expansion and continued intensification of horticulture, so that the volume of employment may not go down there. Making no specific assumption in this respect, we then concentrate on the work norms for field crops and for livestock.

The field crop norms in the Netherlands as around 1950 were among the highest in Europe, meaning that more labour was spent per hectare under most field crops than elsewhere. They have been scaled downward considerably since then, but they are still rather high for the level of mechanisation in the country. For instance, 130 hours per hectare under small grains is a norm that seems to almost entirely ignore the combine harvester. There were 1,200 combine harvesters in the Netherlands in 1950. 3,000 in 1960 and 4,275 in 1962. With less than half a million hectares in grain crops, the country will soom be saturated with combines, if the rate of increase 1960-62 is any indication. In such circumstances, the labour spent on grain crops may soon be reduced to a fraction of what it was in 1960. Similar remarks refer to other field crops, also the root crop norms, which are important in this case, are so high that they could be drastically reduced, not necessarily by 100 per cent mechanisation, but already if a large fraction of these crops were cultivated and harvested with modern equipment. Something similar may be said also about hay harvesting(see below).

By contrast, the norms for animal husbandry in the Netherlands are not particularly high by European standards. The norm for milk cows allows for a herd of 16 cows per worker ; considering the very high milk yields per cow, the output of milk per man-hour in the Netherlands should be among the highest in the workd, at least on farm sizes where the labour is fully employed by prevalent standards. The norms for other kinds of livestock appear somewhat higher relatively speaking, but they too are quite reasonable by European standards.

The question arises : will continued reduction in labour requirements hinge almost exclusively on mechanisation of field crops, or will there be sizeable gains also in animal husbandry ? The question has to be asked specifically with reference to conditions as they exist or can be expected to exist in the Netherlands. Only experts who are well aware of the country's agricultural system can give even a tentative answer.

An attempt has at least been made to provide such an answer. It is so eloquent that it is not necessary to press its evidence very hard. A study published in 1960 was geared at establishing a model for a highly rationalised dairy farm, tentatively in 1970. (1) The model is for a dairy farm of 50 hectares, all in grass, with 66 milk cows and some other cattle, all of which would require less than half as much labour as the same land (all in grass) and livestock would do according to the 1960 work norms. The reduction in labour requirement is so large that it is not necessary to assume all or most of this to become practical by 1970. Within the near future, the better parts of attainable reductions in labour time may still be in field crop farming, but sizeable contributions should be achievable also in animal husbandry. In the longer-run future, Dutch agriculture may do all of its work (with continuing rise in output) with less than half the labour it employed in 1960.

Farm structure and land layout

The increasingly family centered character of the Dutch farm industry may be regarded as one of the chief problems for a continuing adjustment to changing economic and technical conditions. The consequence for farm size and efficiency that would follow from the rate of decennial exodus discussed in the above would be substantially different if past trends continued as regards the composition of agricultural exodus, as against the effect which would follow if future exodus included relatively more farm operators and relatively fewer hired workers than in the past. In the former case, the degree of under-employment might still, in 1970, be of the order of 30 per cent of the agricultural labour force. At the same time it would not be much more than half the number of under-employed units encountered in 1950, when the agricultural labour force was nearly twice as large. With a shift in the composition of exodus farms it might grow substantially larger, which might instigate the degree of under-employment.

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(1) P.P. Wijk:"Een Okdambster bedrijf in 1970", The Hague, Landbouw-Economisch Instituut, 1960 (their"Bedrijfseconomische mededelingen", No. 34).

If the aim is to eliminate any major surplus problem from agriculture over the longer run, then a conscious structural policy must be formulated and pursued. Just what that policy will aim at, can only follow from further technical analyses in combination with a canvassing of the political trends of the country. It appears however as if it would not be impossible to formulate an hypothesis about a future farm size structure that would satisfy the assumptions, and thereafter take steps to promote the transformation of the farm size structure in that direction. In the Netherlands, more than in several other countries, the most logical solution would be in a system of very much enlarged family (or, rather two-family) farms of the size which the best know-how indicates as compatible with high capital intensity and the most advanced techniques in sight.

Such a policy could also lead to a more rapid contraction of the agricultural labour force and farm numbers in the sandy-soils areas than in other parts of the country, with attendant changes in the relative intensity of land use. The related problem of land layout and farm fragmentation cannot be treated here at any depth. The Netherlands is one of the few countries on which the fragmentation problem has been attacked not only with massive action but also with attempts at systematically exploring the best layout for farming purposes. Yet much remains to be done, and the question cannot be neglected whether this type of investment in higher real-estate efficiency will pay its way or perhaps in many cases become obsolete through intervening changes in the farm size structure.

SPAIN

The agricultural population

The highest number of workers in agriculture in Spain was recorded in the 1950 census of population, when the number of male workers was in excess of 4 1/2 million. There has been nearly as many in the period 1910-20, but thereafter a temporary low mark of less than 4 million had been reached around 1930, to be reversed in the course of the 1930's.

Recently available data from the 1960 census of population indicate that a new downward trend has begun, even though as yet of moderate speed. Table 1 shows total and agricultural active population by age. Distribution by sex classified by age is not yet available for the agricultural manpower. 1950 totals are also show for comparison.

The figures in the table refer to active population by industrial classification. By occupational classification the agricultural total is somewhat lower, representing just under 40 per cent of the general total. The inclusion of both sexes in the figures precludes any precise interpretation of changes other than the major ones.

The degree to which the younger age strata show lower agricultural percentages than the middle-aged ones is slight. There appears to have been a certain outflow also of middle-aged workers, because the sub-totals (for 1960) for persons under 65 and over 35 respectively, yield lower agricultural percentages than characterised by the general total in 1950.

Income projections

A few years ago, an economic plan was publicised which forecast a growth in national income by 3 1/2 per cent per year, resulting in a rise of 45 per cent by 1970 and a doubling by 1980,

Table 1

Spain : Total and agricultural manpower (both sexes), by age in 1960 and totals for 1950
(Data in thousands, 000's omitted)

Age (years)	Total	Agricultural (1)	Agricultural as per cent of total
Under 20	1,409	601	42.7
20-24	1,338	498	37.2
25-34	2,699	976	36.2
35-44	2,204	795	36.1
45-54	1,859	725	39.0
55-64	1,395	655	46.9
65 and over	730	381	52.2
Total.	11,634	4,631	39.8
Total 1950	10,793	5,237	48.5
Sub-total under 65 (1960)	10,904	4,250	39.0
Sub-total 35 and over (1960).	6,188	2,556	41.3

(1) Agriculture includes forestry, hunting, and fishing.

Sources : Censo de la poblacion y de las viviendas, 1960, Avance de las clasificaciones de la poblacion obtenido mediante una muestra del 1 por 100. Madrid 1962, pp. 4-5, Table 2. Cf. also Anuario estadistico de España, Año 38, 1963.

over the values for 1960. (1) For agriculture, 50 per cent growth in net value added was forecast until 1969-70, and 79 per cent by

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(1) "Proyecto de desarrollo de la región mediterranea. España." (F.A.O. and Ministero de Agricultura, Instituto de Estudios agro-sociales) Madrid 1959, pp. 254, 331 sqq. See also "Estudios hispanicos de desarrollo economico, España," Fasc. 2, "La agricultura y el crecimiento economico", Madrid 1956.

1979-80, corresponding with 65 and 117 per cent growth, respectively, in agricultural gross output. The rationale for such a high growth rate in agriculture in relation to overall growth, was in a larger scope for export expansion and import substitution with regard to agricultural products. Despite these projections of increases in output and value added, the projection for agricultural population foresaw a reduction in the agricultural labour force (including, in this case, forestry but not fishing) from 4.1 to 3.7 million in 1964, 3.4 million in 1969, and 3.2 million in 1979. The rate of decrease indicated was modest (just under 2 per cent per year) and implied some improvement in the disparity of income between agriculture and the other sectors.

Together with this scheme for using agriculture as the spearhead of economic development went one for transforming Spanish agriculture into a more developed and more intensive industry. Large areas of marginal grain lands were to be reverted to pasture, while the loss of grain area was to be more than compensated by large new irrigated lands used both for high-yielding grain and forage crops and for wastly expanded production of the articles that were thought of expanding in export - fruits and some vegetables.

More recently another projection of economic growth in Spain, has been set forth by an I.B.R.D. mission. (1) In this projection, much less emphasis is placed upon agriculture, but the projected overall growth rate is even higher than in the previously quoted projections. Gross product of agriculture is assumed to increase only by one-third, while that of other sectors would double - this refers to the period 1960-70. The combined growth rate of the Spanish economy would then arrive at nearly 6 per cent per year, or 5 per cent per caput, assuming the rate of population growth to remain moderate.

For labour force, the Bank mission uses these figures (in millions) :

	1960	1970
Agriculture	4.8	4.0
Industries and services	6.8	8.6
Total	11.6	12.6

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(1) "The economic development of Spain". Baltimore 1963, pp. 50-55.

In this projection too, a moderate rate of reduction in the agricultural labour force is foreseen. The difference as against the earlier projection is that the Bank mission applies the same reasoning as in the present report (see especially Chapter 2 above), while the earlier projection was based more on the need for labour than on the distribution of income. The rate of reduction now anticipated is similar to that of the past decade 1950-60. No change in the ratio of income disparity is thus anticipated.

A "Plan of Economic and Social Development" covering the period 1964-1967 has been recently approved in Spain. The plan envisages an annual rate of growth of 6 % for the gross national product. According to this plan it is expected that in the period 1964-1967, 340,000 of the active agricultural population will be transferred to industry and services, which corresponds to an annual rate of decrease of 1.5 per cent.

Labour requirements

The degree of efficiency in Spanish agriculture is not well known. From scattered data and by inference from comparisons between the distribution of farm labour force and that of crops and livestock, it can be shown that the efficiency level is not far removed from the one prevailing in other European Mediterranean countries. In places, the work norms in Spanish agriculture may have been somewhat lower than the corresponding ones elsewhere around the Mediterranean, but this is on account of less fertile soil resulting in less labour intensive methods.

For certain crops, the distribution of the labour load by seasons is known. These indications point to the conclusion that seasonal unemployment was rather marked. That such a level of efficiency can be improved upon very much is beyond doubt. There are fewer topographic hindrances to mechanised cultivation in Spain than in other Mediterranean countries, even though the scope for such operations may, if anything, become somewhat more limited through the long-term scheme for turning low-yielding grain lands into pasture.

The detailed plan for agricultural development, as quoted above, also foresees considerable reductions in the labour load, despite the transition to a more intensive scheme for land use.

From the standpoint of the technical need for labour in agriculture, there is hardly any objection against very considerable reductions in the farm labour force. Previously, the traditional Spanish viewpoint on agricultural labour has been how to accommodate as many as possible in reasonably productive enterprises, rather than risk any shortage of hands. This perspective should change if considerable improvement in per capita real income in agriculture is to be achieved.

Farm and tenure structure

The farm structure in Spain has become known, in its main features, for the first time through the 1960 Census of Agriculture, of which some preliminary figures are available. (1) A direct comparison of percentage distributions with those found in other O.E.C.D. European countries show that a much larger part of the land is in a relatively small number of large to very large holdings.

The number of holdings returned is 2.83 millions. Comparing this figure with those on agricultural manpower it becomes evident that there must be relatively more hired workers in agriculture in Spain than in other O.E.C.D. European countries, which is consistent with the greater prevalence of large farms. Moreover, 0.8 million out of the total are under 1 ha in size, which further underscores the fact that large numbers of agricultural workers do not hold any land of significance.

The small-farm problem is considered serious by the Spanish authorities. About 64.5 % of the farms included in the 1960 Census were less than 5 ha in size, with an average size of 1.6 ha, corresponding only to 6.8 % of the land. There are marked geographical contrasts between regions, and some of the northern provinces are just as ridden by the problem of a dense population living on intensively cultivated microfundia, as any part of Western Europe in the recent past. Thus, in Galicia, almost 80 % of the farms have less than 5 ha covering something more than 27 % of the land, in the Canary Islands, almost 90 % of the farms are less than 5 ha in size, representing 15.6 % of the land, in Levante 78.4 % of the farms have less than 5 ha covering 11.4 % of the land, in Asturias-Santander 80.9 % of the farms have less than 5 ha representing 10.8 % of the land.

The very large farms ought not to present from technical considerations very much of an obstacle to a reduction of the numbers of workers in agriculture. In the past, they have been discouraged to mechanise too fast, for fear that too many landless farmhands should be released too quickly for them to find employment elsewhere. Apart from labour substituting investments, not all the large landholders have been responsive to schemes for making Spanish agriculture more intensive in character.

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(1) "Primer Censo Agrario de España. Año 1960. Resultados provisionales Primera parte. Datos provinciales" - Madrid 1961.

Tenure forms other than owner/operatorship are widespread. This feature, which has been better known for some time than the farm size structure, should also make it easier to adjust the farm structure to changed conditions in the future, whenever the reduction in farm labour force reaches the point of making this necessary. In the small farms areas of the North, ownership by the peasant is prevalent and may come to require measures for structural improvement in the near future. (1)

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(1) In this connection, the Service of Land Consolidation (Servicio de Concentración Parcelaria) has started in 1963 an intensive action towards the solution of the problems associated with the microfundia, especially in the North.

TURKEY

Agricultural population and labour force

The agricultural population of Turkey has been growing, until recent years, at more or less the same pace as the Turkish population at large. The recently published advance tabulations from the 1960 census of population indicate that male workers in agriculture were 62.3 per cent (by occupational classification) or 63.1 per cent (by industrial classification) of total male workers. (1) At the same time, the percentage of individuals for which occupation or industry remained unknown was rather high. When this fraction is eliminated, male workers in agriculture come to approximately 70 per cent of the total specified male labour force, which is very close to the percentage found by the same approach in all the population censuses since 1935 (there is one every 5 years). (2) It may of course be objected that those for which occupation or industry was not made clear in the census are, in their majority, living in areas near cities, while they are few in purely rural areas. But this only underscores a certain tendency towards unclear answers which might easier be filled in by the census agent when he knew that there was no other activity available in the neighbourhood than farming.

From these indications, the male labour force in agriculture in 1960 can be estimated at 4.86 to 5.46 million (the published report has only percentage figures). Whichever the interpretation of the "not declared", the 1960 figure is the highest on record. It is conspicuous too that the alleged agricultural percentages are much higher among women than among men, of itself, this need mean little else than to indicate that activity data for Turkish women are of low reliability.

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(1) 1960 Population Census of Turkey. Estimated national totals based on 1 per cent sample. Ankara 1962, pp. 1, 16, 20-22.

(2) 1955 Population Census of Turkey. Estimated national totals based on 10 per cent sample. Ankara 1957, p. 27, cf. p. 35

However, it appears not unreasonable to assume an unequal sex distribution in the villages, if many rural men are absent, serving in the army or working in the cities, on road construction, etc. The share of agricultural workers in total population can therefore only tentatively be estimated at 70-75 per cent of the total.

The population of Turkey grows at a rate of nearly 3 per cent per year. At this rate, it would increase by over one-third in 10 years, by more than half in 15, and double in about 24 years. The five-year plan proposes alternative grouth rates, assuming somewhat lower birth rates, but no very radical change is anticipated over the next decade or two, and all current forecasts are of similar magnitude as those just mentioned. Obviously the scope for implied off-farm migration is very large before the possibility can come up for a reduction in absolute terms, even though the secondary and tertiary sectors were to expand very rapidly.

Income projections

A recently published plan for the economic development for Turkey, with perspectives up to 1977, aims at a far-reaching transformation of the country. (1)

The plan calls for a rate of annual growth of the GNP of 7 per cent, which would double it every ten years. Agricultural production is assumed to grow at about 4.2 per cent per year, implying an increase in per caput supply of agricultural products of 1.2 per cent. Growth in the industrial and tertiary sectors would thus be considerably more rapid than for the economy as a whole, especially in the beginning. Population active in agriculture would increase from just under 10 million in 1962 to sightly over 11 million in 1977 ; at the same time, its per cent share in total active population would drop from 77 per cent in 1962 to 58 per cent in 1977. The share of agriculture in the GNP would drop from about 40 per cent at the beginning of the period, to 38 per cent in 1967 and 29 per cent in 1977. This would mean some, although modest, widening of the ratio of income disparity between agriculture and the rest of the economy.

Farm and tenure structure

The most recent farm census is not yet available, but there is little reason to expect that the basic land structure has changed much since 1950, a date for which certain structural data are available. (1) The 1950 census enumerated about 2 1/2 million farm holdings, most of them of small or moderate size ; only about 20 per cent of the farm area was in holdings above 70 hectares in side. It would seen from this that at least half the male agricultural population is in the position of farm holder or head of farm household ; the figure may well be higher by 1960. The situation is of no particular concern over the medium-term planning horizon used in the first five-year plan, since no decrease in the agricultural population is anticipated over the next 15 years, but rather a certain continued increase.

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(1) First Five year Development Plan, 1963-1967. Ankara 1963. (Turkish Republic. Prime Ministry. State Planning Organization)

The 1950 census also showed the number of farms by tenure. As was known beforehand, the large majority of holders were either full or part owners (the latter a minority) of their holdings, with only small numbers of holdings entirely rented or entirely held under sharecropping. It is not quite clear how this refers to the situation of the larger farms in the early nineteen-fifties, when some of them mechanized extensive operations and thereby reduced the number of sharecroppers. The cutspoken structure of peasant-proprietor farms, with a minor element of renting, should not be of any particular disadvantage, when it is anticipated that the agricultural population will continue to be of more or less the same magnitude for a prolonged period ahead. If properly guided, this farm structure may prove a suseful framework for achieving gradually more intensive land use and increasing agricultural production.

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(1) 1950 Agricultural Census Results. Republic of Turkey, Central Statistical Office, Publication N° 371, Ankara 1956.

UNITED STATES

Changes in manpower, employment and productivity in United States agriculture have been rapid and dramatic over the last two decades, but the end of these movements is not yet reached. The level of productivity in United States agriculture was always high in comparison with countries in the old world, and the development over the last few decades has allowed the country to remain ahead of any other country (with the exception of Australia and New Zealand, and possibly Canada). Despite this, United States agriculture still has its long standing problems of surplus farm labour and the need for continued adjustments. In addition to its enormous scope (the United States produces about as much agricultural output as all the European O.E.C.D. countries taken together, or about 16 per cent of world production), United States experience is in some ways indicative of what can or cannot be done in other industrialised countries when they reach a corresponding level of productivity.

Agricultural population and labour force

There are no comprehensive figures of the population dependent on agriculture in the United States. (1) In part this is due to the volatile character of large segments of the United States labour force. The total number of persons who do any farm work for wages is rather large and includes a high percentage having other work in addition - and there are all shades as to the importance of one source of employment and income and the other. Also numerous farm operators are part-time employed outside their farms, often in factories or other urban activities. Recent inquiries based on social-security data revealed that the movement into and out of agriculture was far more important than could be surmised from decennial census data or even from annual labour force surveys.

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(1) See Louis J. Ducoff : "Classification of the agricultural population in the United States", in "Journal of Farm Economics", Vol. 37, N° 3, August 1955.

Because of these features in the state of information, attention will have to be focused here upon the farm work force, while the problem of growth potential and implied off-farm migration (that is, including those young people from farm families who never entered the farm labour force) will have to be limited to farm operators and their replacements.

The size of the agricultural labour force can be approached, first, from census data by industrial classification, showing the number of persons whose main occupation was in agriculture. Many of these also had part employment outside agriculture, but for a global estimate of the size of the labour force, their off-farm employment is supposed to be balanced by the temporary employment of individuals whose main activity is in other industries and have agriculture as a secondary activity.

Table 1

United States : Total and agricultural active employed persons 14 years of age and over

(Data in thousands, 000's omitted)

Year	Total active persons	Agricultural active persons	Agricultural as per cent of total
1930 . .	48,595	10,161	20.9
1940 . .	51,742	8,833	17.1
1950 . .	59,015	6,860	11.6
1960 . .	67,990	4,085	6.0

Data for 1950 and 1960 pertain to the United States, those for 1930 and 1940 to the conterminous United States (48 states).

Source : Bureau of the Census. United States, census of Agriculture, 1959, Vol. 2, General Report, Statistics by subjects. Washington, D.C. 1962, page 229.

The numbers include both sexes, all workers aged 14 and over. The sharp fall in the percentage employed in agriculture is in part caused by the higher activity rates for women which obtain in non-agricultural occupations. The numbers of active males, by age, in 1960 are shown in Table 2.

Table 2

United States : Active males, total and agricultural, by age, 1960

(Data in thousands, 000's omitted)

Age (years)	Total	Agricultural	Agricultural as per cent of total
14-17	1,324	255	19.2
18-19	1,156	134	11.6
20-24	3,633	263	7.2
25-29	4,515	265	5.9
30-34	5,195	305	5.9
35-44	10,538	719	6.8
45-54	9,017	817	9.1
55-59	3,491	372	10.7
60-64	2,492	301	15.0
65 and over . .	2,106	415	19.7
Total . . .	43,467	3,846	8.8
Sub-total : 14-64	41,361	3,231	7.8

Source : 1960 Census of Population, table by industrial classification.

The distribution of agricultural percentage by age is characteristic of countries where a rapid diminution of the agricultural population is going on. The ages which are likely to decide the future size of the agricultural population are already down slightly below 6 per cent.

3

The magnitude of 4 million workers shown in the first table can be confronted with other information. One check is in a comparison with the annual estimates of labour requirements in United States agriculture. These indicate a total requirement of 16 3/4 billion hours in 1950 and 10.3 billion in 1960. Divided by 2,500 (as a likely number of hours in a man-year), these figures come to 6.71 and 4.12 million man-years, respectively. The rate of decrease is close to that between total labour force in 1950 and 1960.

A similar check on the reasonableness of the magnitude can be drawn from the 1959 Census of Agriculture. By calculation from data on farm operators and their off-farm employment, and of the expenses for hired labour, rough estimates can be made of the total input of labour on farms. (1) Totals for the country and separately for commercial and other farms are shown in Table 3.

The totals shown here are in sufficiently close agreement both with the population census figure for farm labour force and with the estimates on labour required on farms to be accepted as being close to reality. The small size of the labour surplus indicated by these data depends above all on the fact that the estimates on labour required on farms represent average rather than top-level efficiency.

It should thus be accepted that the farm labour force in 1960 was of the magnitude of 4 million man-years. It is interesting to note that a similar result is obtained if the population census returns for men aged 14-64 are raised by 20 per cent. These totals are 3.23 million according to industrial classification and 3.19 by occupational classification, raising them by 20 per cent, we obtain a figure of 3.8 - 3.9 million.

The rate of decrease, according to population census data, is in excess of 5 1/2 per cent (compound rate) per year. Some of the variation in this respect is shown in Table 4.

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(1) It was assumed that a labour year is 2,500 hours and that a farm operator not reporting off-farm employment, and his family members, are able to produce 3,000 hours ; for farm operators reporting off-farm employment (the part-time farmers), it was assumed that those reporting less than 100 days of work off the farm could, with their family members, produce on the average 2,500 hours of work per year ; those reporting 100-199 days of off-farm work were assumed to produce 1,500 hours of farm work with the help of the family ; and those reporting more than 200 days off the farm, only 500 hours of farm work per year. The hired labour input was computed from the reported expenses for hired labour by dividing the dollar amount of the expense with the average hourly wage for hired farm workers.

Table 3

United States : Estimates of total input of labour on farms in man-years

(thousands, rounded figures)

Category	All farms	Commercial farms	Other farms
Full-time operators . . .	2,450	1,930	520
Part-time operators . . .	980	610	370
Hired workers.	1,050	1,010	40
Total	4,480	3,550	930

Source : Computations based on the 1959 Census of Agriculture, Vol. 2 (a).

Table 4

United States : Male workers in agriculture (industrial classification) aged 14-64, in 1950 and 1960, United States total and selected states

(Data in thousands, 000's omitted)

	1950	1960	Rate of decrease
United States . . .	5,620	3,231	5.7
Illinois	215	143	4.2
Nebraska	129	93	3.3
New York	138	92	4.1
North Carolina . .	294	159	6.2

Source : 1960 Census of Population, table by industrial classification

These rates of decrease are very high and it is surprising that they have left behind as much farm youth as was shown in Table 2. The explanation is in the fact that exodus from agriculture in the United States has by no means been limited to the younger strata. Comparison between the censuses of 1950 and 1960, and especially of the latter with the expected survival rate of each age stratum according to the 1950 census, reveals that at least half a million men have left agriculture who were aged over 35 in 1950. The number is too large to represent only hired workers, it includes considerable numbers of farm operators too.

The composition of the agricultural labour force by status is known from the tables by occupational classification in the 1960 census of population. The male labour force consists roughly of two-thirds farm operators and nearly one-third hired workers, with unpaid family members being only a very small fraction of the total. The proportions are similar also in the four states analysed for this report, with higher than average ratios for both hired workers and unpaid family members in North Carolina, and for hired workers also in New York state.

The detailed composition of farm operator househods by sex, age and other characteristics, is known from 1950 by a report based on a marched sample from the census of agriculture, population and housing. (1) Among other things, and as in 1960, the age pyramids show much more youth under 20 years of age than in the following age strata. A similar inquiry based on the 1959-60 censuses is under preparation but is not yet available. However, already on the basis of the 1960 census of population it has been possible to calculate the number of rural farm males aged 10 and over who will survive until 1970, which would be the potential male farm-operator household labour force in 1970 if "residential" farms had been sorted out and if there were no exodus in between. (2) This number comes close to five million. Since no more than 3 million are supposed to find employment on farms by 1970, this indicates an implied off-farm migration of 2 million. Some details of this projection are shown in Table 5. It appears consistent with an estimate made separately for the number of farm operators. (3)

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(1) United States Bureau of the Census : "Farms and Farm People - Population, Income and Housing Characteristics by Economic Class of Farm", Washington, D.C. 1952, pp. 47 sqq. "Population in farm operator households", by Helen R. White.

(2) C.E. Bishop and G.S. Tolley : "Manpower in Farming and Related Occupations. A study prepared for the President's Panel of Consultants on Vocational Education", July 1962 (mimeogr.).

(3) Warren E. Johnston : "The supply of farm operators" (Ph.D. thesis, North Carolina State College, 1963) projects a decline in farm numbers in the United States of more than 1 million between 1960 and 1970 (page 76).

Table 5

United States : Regional projections to 1970 for males remaining on farms and migrating off farms

(Data in thousands, 000's omitted)

Region	Number of 1960 rural farm males surviving in 1970	Number expected to be rural farm males in 1970	Implied off-farm migration
Northeast . .	348	234	114
North Central	2,070	1,407	664
West	472	284	187
South	2,240	1,170	1,070
United States Totals. . . .	5,130	3,095	2,035

Source : Bishop and Tolley, op. cit., pp. 14, 37-39.

The implied outflow of 40 per cent is thus differentiated as being of the order of around one-third in the North and West and not far from half in the South (in relation to the "no-exodus" totals for 1970).

These estimates include many part-time farmers and some farm residents who are not farmers at all. On the other hand, they do not include the sons of farm wage workers who are not farm residents. The two may be assumed to cancel out, more or less. The projection for 1970 may then be interpreted as meaning a farm labour force, in 1970, equivalent to 3 million man-years, or one-quarter less than in 1960. This would match the estimate for labour requirement for 1970 set forth by the same writers (see below). The compound rate of reduction in the farm labour force would be of the order of 3 per cent over the decade, thus considerably less than in the nineteen-fifties. Needless to say, the manpower thus released to other occupations is very much smaller than the corresponding magnitudes released in each of the two preceding decades

Income projections

The growth of domestic demand for agricultural products in the United States is relatively rapid on account of population growth, which is around 1.7 per cent per year. As mentioned earlier, a growth rate of the demand has been estimated at 2 per cent. Usually, export demand is assumed either to remain static or to grow at the same rate as domestic demand. As overall growth in national income tends to be somwhat slower than in Europe in the present phase, there would be no strong reason for a sharp decline in the agricultural manpower, unless other reasons were more persuasive than the prospective volume of demand in relation to overall income growth.

The rapid decline in agricultural manpower in the United States over the 1950's has in fact only about offset the worsening terms of trade for agriculture. Despite price supports the prices of agricultural products have declined relatively to many other prices, among other things because they have not risen as the purchasing power of the dollar was diminished. The relative income position of the United States agricultural population, when taken as a whole, does not look favourable in comparison with other groups. Value added in agriculture, per caput of the agricultural population, has been and still is only about one-third of the per caput value added in the economy in general ; even when off-farm work and other sources of income are added in, the average farm income level hardly rises above half the income level of the average United States inhabitant.

As agricultural labour fell from 11 1/2 to 6 per cent of total labour force during the fifties agriculture's share in national income fell from 8 per cent to 4. The net result of the changes during the last decade has thus rather been to maintain the relative income position. It has not emproved visibly, nor has it declined very much. The absolute level of farmers' income has risen at a similar pace as incomes in general, at about the distance indicated above. That all this has gone along with such a sharp decline in the number of workers in agriculture, is a measure of the adverse movement in terms of trade and also of the matching upsurge in productivity. It has been suggested more than once that the latter is the cause of the former. The main reason why a continued decrease of farm labour force up to 1970 is anticipated is also in the anticipation of further gains in productivity.

More than once too, it is suggested that this whole line of change is not specifically to the advantage of the farmers. Some individuals go even further and question whether it is to the advantage of the community. Is the labour force released from farming really so much smaller than the increase in labour force needed to produce all the new farm requisites ? The question comes up especially as a way of questioning the soundness of the various systems of agricultural protection.

To this question, an answer has been given which, however tentative and imprecise in detail, is fully convincing as to major magnitudes involved. An analysis of the "accumulated labour" transferred from other sectors to agriculture in the form of farm requisites (external inputs) showed that this accumulated labour quantity is much smaller than the whole quantity of direct labour used in agriculture ; more specifically, the increases in accumulated labour amount to a mere fraction of the savings in direct labour. (1) The answer might have been anticipated, if in a somewhat more vague form, already from the wage differentials between industrial and farm labour, particularly in the United States where this differential is rather wide. In fact, a productivity index based on "accumulated labour" comes out even higher than one based on conventional net productivity analysis.

Along with these various changes there has been, and still is, a rather wide spread of incomes within the farming population. The better-off farmers are well off indeed, while the lower end of the scale includes a measure of genuine poverty. This indicates the strength of the continuing push on those at the bottom of the scale, and equally supplies the rationale for a policy to eliminate what may be termed economic (as different from technical) underemployment. (2) It is also logical, then, that the anticipated outflow should be particularly large in the South.

Labour requirements

The question whether farm production can be carried out with a considerably reduced farm labour force is in the United States answered almost beforehand, despite the high level of efficiency already attained. There are at least two approaches by which this can be demonstrated.

One is by scrutinising current norms for labour requirement for each crop and each branch of animal husbandry and showing how these requirements may become even lower in the future. Current information on labour requirements is based on detailed year-by-year analyses, connecting data from certain bench-mark years in which field survey work was carried out. The data series extends back to 1910 and is on a yearly basis. As already mentioned, the norms refer to average rather than peak-level efficiency situations. Separate series are available for the main parts of the country, reflecting differences in equipment, farming and management practices, and farm sizes.

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(1) See F. Dovring : "Labour used for agricultural production" University of Illinois, Department of agricultural economics, AERR-62, April 1963.

(2) C.E. Bishop : "Economic aspects of changes in farm labour force", in "Labour Mobility and Population in Agriculture", Ames, Iowa, 1961, pp. 36-45.

From such data it is possible to project the situation that will prevail when certain types of improved technology, which are as yet unused or incompletely applied, have become predominant. On such a basis it has been calculated recently that the total requirement for direct labour in United States agriculture by 1970 will be no more than 7.4 billion man-hours, that is nearly 3 billion less than in 1960 - a reduction by about 30 per cent. (1) This is in keeping with the forecast of 3 million man-years of labour remaining in United States agriculture by that time. That this does not exhaust known reserves increase in the technical efficiency of labour becomes evident from recent work towards further reducing the labour requirements in several branches of animal husbandry and horticultural crops.

The second approach is in analysing the actual input of labour on farms as classified by size. In this connection the most interesting type of classification of farms, when the whole country is concerned, is by "economic class". (2) The size of labour input is computed from data in the Census of Agriculture by the same procedure as mentioned above. The results are shown in Table 6.

It was shown recently that there are some 800 thousand farm operators in the United States who produce close to three-quarters of the value of farm output ; these farm operators have family incomes averaging close to $ 10,000 (as against $ 5,500, which is the median income in the country. (3) The three classes included in Table 6 total about 795 thousand farms and account for 72 per cent of all gross sales of farm produce in the country. If direct consumption in farm homes is included in the comparison, the percentage will fall somwhat but not much. In addition, the fact that there is more double counting (of inter-farm sales) on the larger than the smaller farms may lower it somewhat more but still not in any decisive way. It may be said also that the

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(1) Bishop and Tolley, op. cit., pp. 31-33, quoting research by Warren E. Johnston

(2) Size classification by economic class is based on the volume of gross sales of farm products, by value, pertaining to each size class. Imperfect as this is, it is better than classification by acre-size across a country as large and as varied as the United States.

(3) Vernon W. Ruttan : "Discussion : Farm-nonfarm income comparisons", Journal of Farm Economics, 1963, Vol. 45, No. 2, p. 382.

Table 6

United States : Labour used on commercial farms of classes I, II and III, in 1959

(Data in thousands, 000's omitted)

Category	Class I	Class II	Class III	Classes I-III
Full-time operators . . .	98	190	412	700
Part-time operators . . .	13	47	107	167
Hired workers	523	193	154	869
Total. . .	634	430	673	1,730

Source : Computations based on data in the 1959 Census of Agriculture.

pattern of production is not entirely the same on the smaller as on the larger farms ; among other things, the smaller farms have a larger share in certain lines of production such as dairying and tobacco growing. But all of this would not do away with one major conclusion from the figures discussed above : that a very large part of all United States farm products are produced with only about 1 3/4 million man-years of direct farm labour. Allowing 3 million man-years by 1970 is thus an estimate which does not even exhaust the known reserves of unused productivity gains ; it leaves a fair share to be gained in years to come after 1970, and it hardly touches the reserves of productivity gains inherent in technological innovations which are as yet untried or have had but insignificant practical impact to date.

The general validity of this conclusion can be tested also on the level of farm-size measured in acres. This test can be applied only at the State level, where conditions are less widely varying than in the country as a whole. Such a test is desirable also because in such a large aggregate as the United States, a global calculation could allow errors to the plus and the minus side to cancel out.

The size-of-farm test was applied, in the same way as in several European countries, to four states representing fairly diverse conditions of farming and specialization in production : Illinois (central Corn Belt), Nebraska (Great Plains, ranching), New York (dairy) and North Carolina (southern farming, cotton and tobacco). These tests, which it would take too much space to report on here in detail, confirmed that the labour norms, on the whole, represent average rather than peak-level efficiency levels. The larger farms would appear to have a marked shortage of labour (except in North Carolina), the medium-sized to be fully employed, and the smaller ones to have a certain surplus. The discrepancy was particularly large in Nebraska, where the ranches over 2,000 acres in size use only half as much labour as the norms would suggest ; the result is beyond dispute in principle if not in detail because the bulk of the labour input here is inferred from the wage bill with only a small contribution from family labour, and almost all the work is in only two enterprises - beef cattle and haymaking.

When the work norms are corrected in a way that allows the larger farms to break even between labour available and required, and the same efficiency level is applied also to the medium-sized and smaller farms, then it becomes apparent that there is a labour surplus which in all four states is of the magnitude of 25-30 per cent of all the labour used on farms. This measure of technical underemployment does still not include any estimate of the impact of several known technical innovations which are as yet not applied in any large measure even on the large farms.

Obstacles and consequences

From past performance, there would appear to be only moderate obstacles to the removal of the redundant farm labour in the United States. Farms have been getting larger at an impressive rate ; redundant farm buildings are often burnt down or allowed to fall apart when the land of dissolved farms is added to other farms ; and in most parts of the country there is very little of a problem about land fragmentation to stand in the way for the rational use of modern means of production. On the whole, land is sold and rented in parcels which are large enough for most operations. A farm size problem may be said to exist to some extent in the South and in mountainous areas.

From the standpoint of the farming industry itself, the main problem of the future might be in financing farm businesses of the size that will follow from the anticipated further reductions in farm size. The now very high degree of capital intensity, and the samll share of total turnover that comes as net farm income, makes it increasingly difficult for anyone to bring together, even in a lifetime of savings, the assets needed for a full-scale modern operation. It is characteristic that the largest and most efficient farms at present tend to be of mixed tenure - part-owned and part-rented. The even larger holdings of the future may require some innovation in mode of tenure or financing. It is also possible that farms up to now have lived on what is left of the building capital of the past and that a higher level of investment in buildings will be needed in the near future. If this is correct, then it only underscores the conclusion about new paths of financing and/or tenure.

Objections against continued farm exodus in the United States are more often raised from arguments which have more to do with general welfare objectives in the community at large than specifically with efficiency in farming. In doing this, account is taken of the low level of skills usable in other activities which still characterises some categories of the agricultural population in the United States, particularly among small-scale farmers on the border between commercial and other farms, and also among hired farm workers especially in the South. As can be surmised from the data discussed in the above, these unskilled or low-skilled categories are also among those who are least desirable in the farming industry in the future, when the high level of capital use requires farmers to be rather skilled workers. As also pointed out recently, the main problem is not so much how to do the farming without these workers as rather how to get them jobs on which they can earn a decent living elsewhere. The unemployment problem in the United States is for the most part a problem of people having too low qualifications and skills to be effectively employed in the continuously high-mechanised industrial economy of the country. Adding more unskilled ex-farmers to the army of the unemployed will not do much good unless current efforts of training and education are successful.

Still another objection concerns the thinning out of the rural countryside that occurs when farmers become very much fewer than they are now. Especially on the Great Plains, but in general on the more thinly settled or less industrialised parts of the United States, the decline of local towns and the reduction in tax basis appears to many as a threat to the level of well-being for those who remain in these areas. The answer to these problems of regional planning would of course be very incomplete indeed if it implied nothing more than an attempts at retaining more farmers on the land than is economically justified. Local industries, recreational activities and other non-agricultural sources of income are suggested and already tried in many quarters as a more constructive answer. As a variant of the recreation use of land, many farmers in Ohio have begun, in recent years on a more than negligible scale, to receive vacation guests as boarders and as unpaid helpers with their chores. When the farm sector becomes small enough in relation to the expanding cities, the opportunity for temporary rural life as a recreation may become even more attractive.

APPENDICES

Appendix 1

THE TREATMENT OF DEMOGRAPHIC SOURCES

The variety of approaches and statistical principles encountered in data on farm population and farm labour force necessitates some measure of rearrangement of data, whenever a common analytical viewpoint is applied either over time or across national boundaries.

Information on the contribution to farm work by housewives, other female members of the farm household and teenagers and older persons, is in most cases of low reliability. They often reflect conventional attitudes rather than a recording of actual labour input. This source of error may work both ways, either as an over- or an under-estimation of the contribution by these categories. Correction can sometimes be made on the basis of well informed observation of work habits and social customs, but such correction cannot be carried to any high degree of statistical precision. The limit between labour force participation in the accepted sense, and non-participation (household work, semi-retirement) is unclear not only in the data but oftentimes also in reality.

To minimise these difficulties, it is proposed to count, primarily, male workers aged 15-65 (or some closely similar age limits, as the census material may permit). These should be regarded as the core of the agricultural labour force. If this core can be measured with tolerable accuracy, the effective size of the agricultural labour force might be estimated, for instance by assuming that it is a more or less constant function of the size of that core.

A reason for proposing this procedure is in the very nature of the labour force participation (in agriculture) of women, youngsters and older persons. To a large extent they are a reserve which is drawn upon when the need arises, particularly in peak seasons but also for farmyard chores and other jobs which the regular male workers cannot handle simultaneously with their main tasks. There is strong reason to believe that the degree to which such auxiliary workers return labour time done on the farm depends on the need for their contribution rather than their availability. The same goes for temporary employees (seasonal or occasional farmhands). To a varying extent they are recruited from other occupations in rush seasons. The degree fo their participation in agricultural work is not only afunction of the lack of employment elsewhere, but also of the availability of such employment in agriculture.

Another difficulty in data on agricultural labour force lies in the approach to dual employment. Individuals who work alternatively in agriculture and in other occupations may return one or the other as main occupation but this does not always reflect which one is the most important. The share of agriculture in a person's labour time and in his earnings is often not the same, and the answer may then depend on the way the question was formulated - as one of time employed or of livelihood. It is often influenced, also, by the time the survey is conducted the answer may be agriculture more often if the survey is taken at a season when there is much employment in agriculture, and vice versa. Also other circumstances may influence the answer, such as the consequences for social security or unemployment insurance of declaring one or the other as the main occupation.

In this report no attempt was made at a systematic approach to the problem of classifying dually employed persons. The assumption is made, for simplicity, that the non-agricultural employment of those who declare agriculture as their main occupation or industry would cancel out, on the whole, the agricultural employment of persons whose main line of work is outside agriculture. This simplified assumption is made here for lack of anything better. A more refined and systematic approach appears desirable but is difficult to formulate.

In some cases there is also a problem of choice between alternative or complementary sources. The above assumption of "cancelling out" the cases of dual employment can be made only in the case of a population census or a labour force survey which encompasses all branches of activity. In a census of agriculture, where only the agricultural population is canvassed, there is less of a safeguard against over-enumeration of the population or labour force to be regarded as agricultural in the proper sense. At the same time, an agricultural census often provides more detail, and more of a link to the farm structure than can be obtained in a population census or a labour force survey.

Reconciliation of agricultural and population census data would be ideal but is difficult and seldom successful. The best instance to date is the United States "matched sample" of the 1950 censuses, but even this one has its problems ; one of these is the disregarding of that part of the agricultural labour force which does not belong to farm operator households. For future attempts at such reconciliations it appears preferable to use the industrial classification of labour force in the population census as coming closest to the concept of the agricultural census (which is an industrial census). In the present report, data by industrial classification were preferred when the choice was available.

A much more refined account of total labour input in agriculture is nowadays available from several countries in the form of "man-year" calculations. In these, each category of permanent agricultural workers has been assigned a weight ; the temporary workers have either been assigned a lower weight, or else their total contribution has been measured as so many hours worked, which is thereafter converted into man-years using some assumption about the length of a man-year and applying the same weights to worker categories as on full-time workers. In the most refined approaches, also the off-farm work of permanent workers (especially the farm operators) is counted and deducted. The result is an estimate of total actual input of direct work into agriculture.

Man-year estimates have great merit as an element in economic analysis of the productive process in agriculture, and they are in many ways useful for studies of past trends. For inquiries such as the present one, their limitation lies in the fact that they lend themselves to projection only on the basis of some blanket assumption, such as for instance extrapolation of past trends. They do not lend themselves directly to projection by means of demographic analysis.

The relation between man-year calculations and the number of male male workers aged 15-65 can be illustrated from some countries, as shown by the figures below.

The data show that male workers within the age limits indicated are in all cases the bulk of the agricultural work force. If no other indication were available, an estimate of the actual labour input could be based on the number of male workers within these age limits, plus 20 per cent of their number, and such an estimate would in all the cases shown be of the right magnitude, if sometimes on the low or high side by a few percentage points. The allowance to be made for other worker categories might in some cases be refined by more precise observation of the composition of the labour force by age, sex, and category.

Country	Year	Male workers aged 15-65 or similar limits (000)	Man-years (000)	Proportion
Denmark . . .	1950	339	390	100:115
France	1954-55	2,750(a)	3,184(b)	100:116
Germany . . .	1960	2,080	2,377	100:114
Netherlands . .	1956	388(c)	469	100:121
	1960	330(c)	431	100:130
United States .	1950	5,620	6,710(d)	100:119
	1960	3,231	4,120(d)	100:128

(a) Family workers aged 14-65 plus hired workers without age limits.

(b) "Man-years" as defined in the 1955 census of agriculture, less one worker per household (for household work).

(c) Under 65, those under 15 being very few.

(d) Calculated average requirement, known to be close to actual input.

It follows from this that a projection made by means of demographic analysis, yielding in the first place an estimate of the male labour force aged 15-65 at some future date, would also allow to make an estimate of the approximate size of the total man-year equivalent labour force ; such a projection would stand more of a chance to come right than any projection of "man-year" data on any blanket assumption of future trend.

For a successful forward projection of this kind it is of course preferable to have data on the whole population dependent on agriculture, classified by age and sex. For projections not exceeding 15 years into the future from the last census, no assumption on birth rate would be necessary. With only data on labour force by age and sex, projections are much more uncertain and have more limited value. By comparison between tables on total and active agricultural population we can, specifically, find the age- and sex-specific activity ratios which cannot be assumed to be the same in the agricultural as in the non-agricultural population. There is good evidence to the contrary. On the other hand, the age- and sex-specific death rates are likely to be the same, at least in countries of low death rates and high life expectations ; and such differences as there may be in this respect in the highest age strata will not affect the type of estimate proposed in this report. Correction will have to be made, for more accuracy, for anticipated changes in school attendance.

A special problem comes up when, as in the last French census, it appears that the returns on total agricultural population includes young adults who already have a non-agricultural occupation although still residing in the home of their parents. The age-specific activity ratios that come out of such a table must be corrected before they can be applied to estimates for the future.

Appendix 2

WORK STUDY DATA AND THEIR TREATMENT

Work study material, resulting in norm figures for the consumption of labour in various agricultural operations, are available from several countries and in some of them in such shape that they allow to establish time series of labour input needed as contrasted with that actually made.

There are two main approaches by which such labour norms may be established : either by a work time budget for a whole farm which is then more or less accurately broken down on operations and enterprises, or by direct work study measurements of time spent in the various work operations and on moving back and forth between operations. In the former case a whole time period is distributed between enterprises ; in the latter, time study elements are added together to find the time required for a given enterprise.

In either of these cases it is preferable, for analyses such as those shown or suggested in this report, to use labour norms which are derived from the same source or a few directly comparable sources, in such a way that overlaps or omissions between enterprises are avoided. This of course means that a distinct basket of enterprises is kept in mind, and labour norms are therefore not in any strict sense transferable from one country to another. Only when direct information is lacking, may it be a second best to use norms borrowed from studies made in another country, or in general under different conditions, and then only with such reserves as this will necessitate. This point is of importance above all in multi-enterprise farming with a high degree of integration between the various enterprises. It is obviously less important on single-enterprise farms or in single-enterprise areas, or when two or more enterprises are essentially self-contained and distinct from each other with little or nothing in common for their operations.

When labour norms corresponding to a certain level of technology are applied to the agricultural statistics of a given country or area at a given point in time, in order to estimate the size of the job, then this implies an assumption that this level of technology prevails in the country at the time. It does not exclude the possibility that a smaller number of farms may be more advanced, nor does it overlook the possibility that numerous farms, especially among the smaller ones, may not live up to the generally available level of technology. They may fail to do so because of structural obstacles ; short of these, the goods and the funds necessary for investment towards this "normal" level of capital intensity and applied technology would, in principle, be available - this is what the assumption implies.

There are of course - and quite often, too - phases of transition from one level of technology to another one. The level of technology assumed as generally available, in such a case, represents an average or a compromise between a lower level, still represented on many farms, and a higher one, already achieved by a significant part of the farms but not quite generally available - if for no other reasons than financial restrictions which may apply not only to certain farm sizes but also to certain farm types or combinations of enterprises.

This must be kept apart from another distinction which is of importance for the interpretation of analyses based on work study data and labour norm figures : that between "average" and "normal" efficiency. The former concept represents the average of all the efficiency levels actually at hand in the country, and thus allows a significant part of the farmsto be substantially more efficient than the norm indicates. Such is the case with the labour norms used by the United States Department of Agriculture for their long-term time series which reflect a rather close coincidence between labour required and available ; analysis by size of farm revealed that many of the larger farms use substantially less labour than the norms would suggest, especially in some farm types and areas. The same seems to be true about some of the older data series from the Mediterranean countries, which reflected rather directly the wide-spread low technical level on traditional peasant farms and probably left out such advances as were already made in some areas and on the more advanced farms.

In contrast to the "average" approach is the "normal" or "normative" one which builds up the norms that should be expected on farms with a stated level of efficiency from time study data. This level can be different for different kinds of farms, e.g. smallholdings using only family labour versus labour-hired farms using large quantities of wage work. For measurement of labour surplus, the most useful kind of norms is that which is normative with reference to the better half of the country's farms ; it may still allow a small number of very top-level farms to be even more efficient, but they should represent only a minor part of the farm industry of the country. The norms recently communicated from the Netherlands are of this type, and also several of the series available from Germany and the Scandinavian countries correspond to this criterion. The measurement of labour surplus by such tools is then done with reference to a part of the farm structure which, under prevalent conditions, would permit full employment of its labour, and the surplus existing on other farms is then measured as a total, whether it is tied down for reasons of structural obstacles or for other reasons. The analysis of the surplus in those terms, and how far it can be characterised as structural or immediately removable, would then be a subsequent step in the analysis.

To characterise a norm series as belonging to either of these types we have, apart from the technical descriptions of the norms themselves, also the farm-size check (wherever applicable) as described in Chapter 3 above and illustrated in some of the country chapters.

Appendix 3

LIST OF PARTICIPANTS

of the Meetings of experts held in Paris on
2nd-3rd July 1963 and 28th-29th November 1963

FRANCE

M. ESTRANGIN, Président de la Fédération Nationale des
Organismes de Gestion Agricole,
74 avenue de la Bourdonnais, Paris 7

GERMANY

H. KÖTTER (1), Forschungsgesellschaft für Agrarpolitik und
Agrarsoziologie,
Nussallee 21, Bonn

GREECE

N. POLYZOS (1), Directeur de la Division de la Main-d'Oeuvre
et des Affaires Sociales
Ministère de la Coordination, Athens

P.A. YOTOPOULOS (2), Acting Director, Centre of Economic
Research
6 Amerikis Street, Athens

---

(1) Attended first meeting only.
(2) Attended second meeting only.

ITALY

G.G. DELL'ANGELO, S.V.I.M.E.Z.
6 via di Porto Pinciana, Rome

G. DE ROSSI (1), S.V.I.M.E.Z.
6 via di Porto Pinciana, Rome

NETHERLANDS

A. MARIS, Agricultural Economics Research Institute
Conradkade 175, The Hague

UNITED KINGDOM

J.A. EVANS, Ministry of Agriculture, Fisheries and Food
Whitehall Place (West Block), London S.W.1

UNITED STATES

C.E. BISHOP, Chief of the Rural Economics Department
North Carolina State College, Raleigh, North Carolina

YUGOSLAVIA

P. MARKOVIC, Poljoprivredni Fakultet-Zemun,
Belgrade-Zemun

---

(1) Attended first meeting only.
(2) Attended second meeting only.
(3) Attended part of the second meeting only.

C.E.E.

A. CAPPELLETTI (2), Direction Générale de l'Agriculture
Direction des Structures
C.E.E., Bruxelles

X. LANNES (1), General Directorate No. V, (Social Affairs)
C.E.E., Brussels

CONSULTANT

F. DOVRING, Department of Agricultural Economics, College of Agriculture, University of Illinois
Urbana, Illinois

VICE-CHAIRMAN OF THE O.E.C.D. COMMITTEE FOR AGRICULTURE

R.A. BRAND (3), United States Delegation to O.E.C.D.
Paris

O.E.C.D.

Directorate of Economics and Statistics

G. BLOCH (1), Head of Section for Structural Statistics (Agriculture, Energy and Manpower)

Directorate for Manpower and Social Affairs

Y. HOFLACK (3)
Head of Section for Vocational Training

G. RELLINI (1)
Head of Section of Employment Service and Migration

---

(1) Attended first meeting only.
(2) Attended second meeting only.
(3) Attended part of the second meeting only.

Directorate for Agriculture and Food

Division for Agricultural Policies

A. SIMANTOV (1)
Head of Division

H. RAIDL (2)

Division for Technical Action

B.L. ROWAN
Head of Division

E. MEJER (1)
Head of Section for Coordination and Programming

J.T.P. DE REGT
Head of Section for Structural Adjustments
and Marketing of Agricultural Products

R.P. PROUD
Section for Structural Adjustments and
Marketing of Agricultural Products

---

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